

THE DENTAL PRACTITIONER

AND DENTAL RECORD

Including the Transactions of the British Society for the Study of Orthodontics, and the official reports of the British Society of Periodontology, the Glasgow Odontological Society, the Liverpool and District Odontological Society, the North Staffordshire Society of Dental Surgeons, the Odonto-chirurgical Society of Scotland, and the Dental and Medical Society for the Study of Hypnosis

Editor:

* DONALD D. DERRICK, L.D.S. R.C.S., D.D.S. (Penn.)

Editorial Committee:

- | | |
|---|---|
| Prof. J. BOYES, F.R.C.S. (Edin.), F.D.S. (Edin.), F.D.S. (Eng.) (Edinburgh) | B. C. LEIGHTON, L.D.S. R.C.S., H.D.D. R.F.P.S. (King's College Hospital) |
| * R. V. P. CAMPBELL, F.D.S., H.D.D. R.C.S. (Edin.), D.D.S. (Amer.) (London) | Prof. R. W. LOVEL, F.D.S. R.C.S., H.D.D., D.D.S. (Newcastle) |
| B. E. D. COOKE, F.D.S. R.C.S., M.R.C.S., L.R.C.P. (Guy's Hospital) | * H. MANDIWALL, M.B., B.S., L.D.S. (Royal Dental Hospital) |
| Prof. A. I. DARLING, M.D.S., F.D.S. R.C.S., L.R.C.P., M.R.C.S. (Bristol) | Prof. A. S. PROPHET, B.D.S., L.D.S., D.D.S. (University College Hospital) |
| Prof. A. D. HITCHIN, M.D.S., F.D.S. R.C.S. (St. Andrews) | Prof. T. TALMAGE READ, M.Ch.D., F.R.F.P.S., F.D.S. R.C.S., H.D.D., L.R.C.P. (Leeds) |
| J. K. HOLT, L.D.S., M.Sc., D.D.S., F.D.S. R.C.S. (Manchester) | Prof. G. L. ROBERTS, M.B., CH.B., B.D.S., F.D.S. R.C.S. (Sheffield) |
| Prof. F. E. HOPPER, M.D.S., F.D.S. R.C.S. (Leeds) | * J. E. SEEAR, L.D.S. R.C.S. (London) |
| J. IRELAND, L.R.C.P., L.D.S. (Glasgow) | D. S. SHOVELTON, B.Sc., B.D.S., F.D.S. R.C.S. (Birmingham) |
| I. R. H. KRAMER, M.D.S., L.D.S. R.C.S. (Eastman Dental Hospital) | * D. F. SOUL, F.D.S. R.C.S. (London) |
| Prof. F. E. LAWTON, B.D.S., D.D.S., F.D.S. R.C.S. (Liverpool) | Prof. P. J. STOY, B.D.S., F.D.S. R.C.S. (Belfast) |
| | * N. LIVINGSTONE WARD, L.D.S., D.D.S. (London Hospital) |

* Constitute the Executive Committee

VOL. X, No. 7

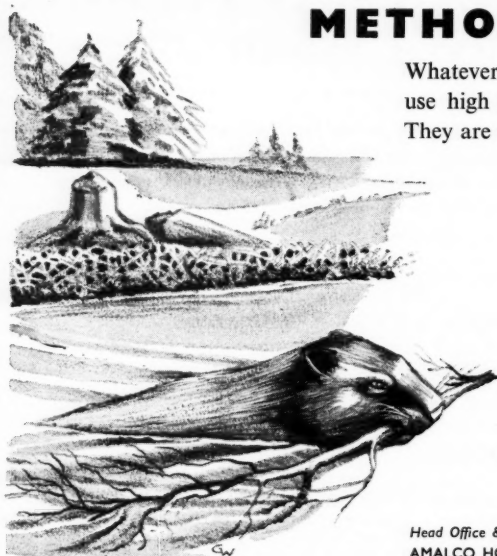


March, 1960

Monthly 3s. 6d. **JOHN WRIGHT & SONS LTD.** Annually £2 2s.
 post 5d. BATH ROAD, BRISTOL 4 post free

SOLE AGENTS: *Australia*: Robertson & Mullens Ltd., Melbourne; *Canada*: The Macmillan Co. of Canada Ltd., Toronto; *New Zealand*: N. M. Peryer Ltd., Christchurch; *Denmark*: Einar Munksgaard, Copenhagen; *Norway*: Olaf Norli, Oslo; *Sweden*: Gumperts Aktiebolag, Göteborg; *South Africa*: P. B. Mayer, Cape Town.

METHOD



Whatever the technique it is important to use high grade instruments and materials. They are of critical importance as they enhance your skill now, as a student, and in the future as a practising dentist. It is a wise policy to buy the best, and where better than from the most experienced dental house.



Head Office & London Showrooms:
AMALCO HOUSE, 26-40 BROADWICK ST., LONDON W.1

To prevent infection after extraction

'Hibitane' Lozenges each contain 5 mg. of 'Hibitane' (Chlorhexidine Hydrochloride B.P.C.), together with a small quantity of Benzocaine B.P. (2 mg.) which does not hinder healing. Saliva tests have shown that 'Hibitane' Lozenges are markedly superior to other types of antiseptic lozenges in destroying common pathogens, including streptococci, and for this reason they are particularly suitable for use by dental surgeons in preventing secondary infection following dental extraction.

Hibitane ANTISEPTIC LOZENGES

TRADE MARK

Basic N.H.S. cost of a pack of 12 Lozenges is 1/5d plus purchase tax.
A dispensing pack of 250 Lozenges is also available.

IMPERIAL CHEMICAL INDUSTRIES LIMITED
PHARMACEUTICALS DIVISION WILMSLOW CHESHIRE



Ph.901/1

THE DENTAL PRACTITIONER

AND DENTAL RECORD

Vol. X, No. 7

CONTENTS

March, 1960

	PAGE
EDITORIAL: PERIODONTAL CINDERELLA - - - - -	147
EFFECT OF NOISE MADE BY THE DENTAL TURBINE DRILL	
<i>Ian G. Robin, M.A., F.R.C.S.</i>	148
THE USE OF ROTARY DIAMOND INSTRUMENTS IN GINGIVOPLASTY	
<i>W. M. Oliver, B.D.S., L.D.S.</i>	153
THE CERVICAL AMALGAM RESTORATION AND ITS FAILURE	
<i>G. F. Kantorowicz, B.Sc., B.D.S., L.D.S., R.F.P.S.</i>	158
THE SCREW AND HINGE APPLIANCE - - - - -	161
<i>J. Poustie, L.D.S.</i>	
NEW MATERIALS AND APPLIANCES - - - - -	164
BOOK REVIEWS - - - - -	165
ABSTRACTS FROM OTHER JOURNALS - - - - -	152, 157, 167, 92, 94
LETTER TO THE EDITOR - - - - -	166
TRANSACTIONS OF THE BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS:	
CONGENITAL PARTIAL AGLOSSIA - <i>J. H. Gardiner, B.D.S., D.Orth. R.C.S.</i>	83
MODIFIED 0.77 MM. LINGUAL ARCH FOR ANTEROPOSTERIOR EXPANSION OF THE MANDIBULAR ARCH - <i>D. G. Gould, B.D.S., F.D.S., D.Orth. R.C.S.</i>	88
AN INVESTIGATION INTO THE INFLUENCE OF THE SOFT TISSUES ON TOOTH POSITION <i>D. A. Dixon, F.D.S., D.D.O.</i>	89
AIDS TO APPLIANCE TECHNIQUE - <i>Mrs. S. J. Jackson, F.D.S., D.Orth. R.C.S.</i>	93

ADVERTISEMENTS

Rates: Full page—£15 15s.; Half page—£8 8s.; Quarter page—£4 10s.

Special Positions and Covers: Full page—£17 17s.; Half page—£9 9s.;

Facing text (full pages only)—£18 18s.

Colour—£9 per colour additional to page rate.

Series Discount—10% for 12 insertions, 5% for 6 insertions.

Agency and Publisher's Commission: 10%.

Classified Advertisement Rates: See p. xviii.

Type Area: Full page— $5\frac{5}{8} \times 7\frac{3}{4}$ in.; Half page— $5\frac{5}{8} \times 3\frac{3}{4}$ in.; Quarter page— $2\frac{3}{4} \times 3\frac{3}{4}$ in.

Screen for Blocks: Text pages and cover 133.

Copy: First week of preceding month.

For further particulars write to:

Advertisement Manager, John Wright & Sons Ltd., Bath Rd., Bristol, 4 (BRISTOL 75375)

or, for London Area to:

Cecil M. Kaufman, 49, Upper Park Rd., Hampstead, London, N.W.3 (PRIMROSE 0552)

EDITORIAL NOTICES

CONTRIBUTIONS should be sent to the Editor, *The Dental Practitioner and Dental Record*, The Stonebridge Press, Bath Road, Bristol 4, or, if preferred, to any member of the Editorial Committee. Original articles are accepted on the understanding that they are contributed solely to this Journal.

Manuscript should preferably be typewritten with double spacing and wide margins, and the author should keep a copy. Articles and their illustrations become the property of *The Dental Practitioner and Dental Record*, unless authors reserve the right before publication.

Illustrations should be clearly numbered and legends should be written on a separate sheet of paper and not put on the backs of the originals. Each figure should be referred to in the text. Prints are preferred to X-ray negatives and should be on glossy paper. Lettering which is to appear on illustrations is best shown on an overlay or rough sketch. It should not be put on the original.

Tables should be typed on separate pages and each should have a caption which will explain the data without reference to the text.

References to dental literature should be recorded in the text, with the name of the author and the year of publication in parentheses. In the bibliography they should be arranged in alphabetical order in the following form, the abbreviations of periodicals being those adopted in the *World List of Scientific Periodicals* (1952), e.g.:—

SMITH, J. A. K. (1949), *Brit. dent. J.*, **86**, 271.

LEWIS, R. W. B. (1947), *The Jaws and Teeth*, 2nd ed., 471. London: Science Publishing Co.

Authors may obtain reprints of their articles if the Publishers are informed when the proofs are returned. They will be charged at the cost of production and 50 copies are suggested as a minimum.

BUSINESS COMMUNICATIONS should be sent to the Publishers, The Stonebridge Press, Bath Road, Bristol 4.

Back Numbers.—The Publishers would be glad to purchase copies in good condition of Nos. 1 and 5, Vol. I, Nos. 3 and 5, Vol. V, and No. 2, Vol. IX, of *The Dental Practitioner*.

Binding Cases.—Binding cases for Volumes I to IX may be obtained from the Publishers at 5s., post free. They are supplied attractively lettered in imitation gold on a dark red ground. If desired, the Publishers will undertake the binding at an inclusive charge of 16s. 6d.

REPRINTS

Reprints can be supplied at a reduced price if authors will indicate their requirements at the time that proofs are returned. The following scale will be helpful as a guide to the cost; 50 copies are suggested as the minimum number.

PAGES	NUMBER REQUIRED							
	50	100	150	200	250	300	400	500
2	£ 1 0 0	£ 1 5 0	£ 1 10 0	£ 1 14 0	£ 1 17 0	£ 2 0 0	£ 2 5 0	£ 2 10 0
4	1 15 0	2 4 0	2 13 0	3 0 0	3 5 0	3 10 0	3 19 0	4 8 0
6	2 10 0	3 2 6	3 15 0	4 5 0	4 12 6	5 0 0	5 12 6	6 5 0
8	3 0 0	3 15 0	4 10 0	5 2 0	5 11 0	6 0 0	6 15 0	7 10 0
10	3 10 0	4 7 6	5 5 0	5 19 0	6 9 6	7 0 0	7 17 0	8 15 0
12	4 0 0	5 0 0	6 0 0	6 16 0	7 8 0	8 0 0	9 0 0	10 0 0
14	4 10 0	5 12 6	6 15 0	7 13 0	8 6 6	9 0 0	10 2 6	11 5 0
16	5 0 0	6 5 0	7 10 0	8 10 0	9 5 0	10 0 0	11 5 0	12 10 0
Printed Covers	£ 1 12 6	£ 1 17 6	£ 2 2 6	£ 2 7 6	£ 2 12 6	£ 2 17 6	£ 3 7 6	£ 3 17 6

THE DENTAL PRACTITIONER AND DENTAL RECORD

Vol. X, No. 7

March, 1960



EDITORIAL

PERIODONTAL CINDERELLA

THE main aim of most dental research to-day would seem to be the discovery of the cause and prevention of dental decay. One day this universal disease will be eliminated or at least reduced to a minimum. Human society will then breathe a sigh of relief and imagine that the day of the dentist will be over. Nothing will be farther from the truth.

The Cinderellas of the profession will then come into their own. The periodontists will be faced with the problem of preserving all the sound teeth which will be exfoliated because of periodontal disease.

Hardly a man, woman, or child is free from some form of gingival inflammation. Truly periodontal disease is as great a scourge of mankind as is dental decay. Yet less attention has been paid to its research, to its prevention, and to its treatment. Probably because in most cases periodontal disease gives rise to little pain and the public are conditioned to the inevitability of tooth loss—whether it be sooner or later is of little concern.

It would seem that one of the factors in the failure of public appreciation of the importance of gingival health can be laid at the feet of the average dentist. In the normal dental examination we give but a cursory glance at the gingival tissues; we remove some of the calculus adhering to the teeth, but seldom give an adequately deep scale and polish. We do not really indicate to our patients the importance of prophylaxis.

The periodontist himself is not altogether blameless. To the dentist he seems to have been arguing for years about the classification

of periodontal diseases and even whether the disease should be called "periodontal" or "paradontal".

Such arguments are happily disappearing and those who are principally interested in the investing and supporting tissues of the teeth are devoting themselves to problems of greater significance.

Great strides have been made, particularly in the Scandinavian countries, and on April 4-6 public lectures will be given at the Eastman Dental Hospital by eight leading Scandinavian authorities under the auspices of the British Society of Periodontology. These lectures will be open to all the profession, and details will be found elsewhere in this issue.

Those who attend this Scandinavian Symposium will undoubtedly come away enriched and greatly stimulated—teachers to return to their schools, practitioners to their practices, both dedicated to better periodontia but with a question in their minds, "How best can the public be served in the treatment of this disease?"

The answer must surely be a delegation of the more technical aspects of periodontal therapy to ancillary personnel as has been done in medicine. No medical man has suffered through having the assistance of many different individuals, all of whom are experts in their own fields. Dentists may well forget the cry of "dilution" and instead welcome the advent of hygienists and auxiliaries who will provide them with the time in which they can develop their biological approach to the problems of the mouth.

EFFECT OF NOISE MADE BY THE DENTAL TURBINE DRILL*

By IAN G. ROBIN, M.A., F.R.C.S.

Consulting Surgeon, Ear, Nose, and Throat Department, St. Mary's Hospital, Paddington, W.2

GENERAL CONSIDERATION OF THE EFFECTS OF NOISE

NOISE affects the human being in two ways: by its nuisance value and by damage to the hearing. These are two quite different things, the first being chiefly on the cerebral centres and the second on the cochlea, or end-organ, in the ear. The nuisance value of noise will not be considered; it depends on many factors and varies with the type of noise and the adaptation of the human mind.

The damaging effect of noise or "acoustic trauma" depends on five main factors: (1) Noise level; (2) Length of exposure; (3) Continuity of exposure; (4) Frequency component of the noise; (5) The susceptibility of the person exposed.

It is helpful to go into some detail on each of these five separately, in order to give a broad outline of the picture.

Noise Level.—The maximum noise level (or sound-pressure level) found to have a damaging effect of a permanent nature (i.e., injurious level) differs slightly with different frequencies; high-pitched noise is more injurious than low-pitched noise. The borderline between innocuous and injurious levels differs with different authors and in different countries. In Britain no standards have been agreed on, up to date. In the U.S.A. and Japan it is 90 decibels (dB) at 2000–3200 cycles per second (c.p.s.), and 85 dB at 3200–6400 c.p.s.; while in the U.S.S.R. it is 75–85 dB for all frequencies between 800 and 12,000 c.p.s. (Glorig, 1959). In the U.S.A. there is an increasing appreciation of the damaging effect of noise, and programmes for "the conservation of hearing in noise" are being worked out enthusiastically in many States (Snow, 1959). In the U.S.S.R. there are also strict standards and regulations for the restriction of noise in industries (Slavin,

1959). In no country, however, is found any specific mention of the effect of high-speed dental drills when used for specified periods of time. Since 1958, however, one firm of makers of sound-level meters advertise that one American firm of dental drill makers ensure that the noise of finished instruments does not exceed the standard set in the U.S.A.

The injurious quality of the noise is greatly affected by resonance and reflection. It is "damped" by absorbent coverings of walls, barriers, etc. The distance from the source of noise has a marked effect on the sound pressure level (S.P.L.). This is reduced at the rate of 6 dB per doubling of the distance from the noise source (Glorig, 1959).

Length of Exposure.—The length of exposure is an important factor, but must be taken in connexion with the other four, and especially with the susceptibility of the person exposed. As a general rule, the longer the exposure, the more likelihood of a damaging effect. This has been known for a great number of years (e.g., Holt (1882), in the U.S.A., and Ritchie Rodger (1915), in Britain). The latter investigated deafness in boiler-makers. In 1957 Fisch investigated the effect of noise from pneumatic drills, where there was the high intensity noise of 95 dB. He concluded that "it is possible for some individuals to be exposed for many hours a day to a very loud noise for several years without necessarily suffering serious damage to the function of hearing". On the other hand he states, "there is hardly any doubt that in the majority of pneumatic drill operators the noise does impair the hearing, and in a few the impairment can be of such a degree that hearing for speech in everyday life could be seriously affected".

Continuity of Exposure.—A certain continuity of a noise at each exposure is necessary if damage is to be produced. This is a different mechanism from the "explosive"

* Based on a paper given before The London Dental Society on September 23, 1959.

damage of a very loud single noise which causes a blast effect on the cochlea. This also applies to the effect of prolonged exposure to "small arms" gunfire (e.g., rifle and 12-bore shotgun) (Meyrick, 1946; Robin, 1952). The ear can also tolerate without damage a single loud noise up to 130 dB. The repetitive "insults" of prolonged noise at the "injurious"

considerable changes in a few hours in riveters: the noise intensity was as high as 120 dB. He found similar improvement in a person not accustomed to noise.

With the increasing importance of compensation and litigation, this problem requires much more study. It must be realized that although the noise intensity of dental turbine

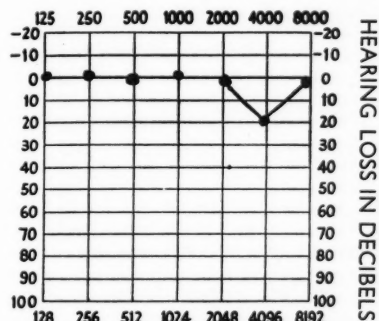


Fig. 1.—Audiogram with "dip" at 4096 c.p.s.

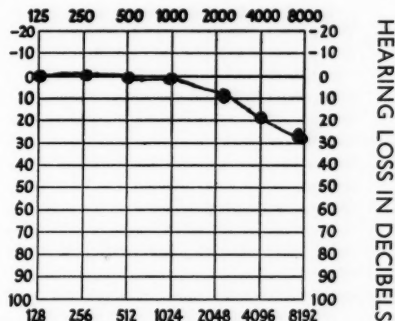


Fig. 2.—Audiogram with gradual sloping loss for high frequencies of slight degree.

levels are more likely to cause damage if rest periods or intervals are not given. The ear has a remarkable ability to adapt itself to tolerate noise if the nerve-endings are allowed "rest periods". The length of the rest periods necessary to obtain a return of normal hearing will differ with various factors (especially the susceptibility one), and would have to be determined in each case. This raises a tremendous problem as to when a loss can be considered temporary or permanent, and what are the possibilities of recovery in each case. The term "concussion" of the cochlea has been used to denote a temporary effect by trauma of an explosive nature: it is not yet known if "acoustic" trauma by noise follows the same chemico-pathological pattern. In concussion, six months is considered the time limit for recovery of nerve function (Robin, 1952), but it may well be that with a special nerve such as the auditory one, this period is too long. It would certainly be expected that a minor degree of hearing loss, such as 20 dB, would recover completely in a few days or at most a few weeks, if no further exposure to noise is experienced. Larsen (1953) has found

drills does not usually reach harmful levels, in some instances it may do so, and damage become possible. Some authorities have found that loud noise interrupted several times a minute has a worse effect than continuous noise of the same intensity. (A certain increase of "nuisance value" may come into force here.)

Frequency of Noise.—The frequency of a noise is an important factor because the cochlea is more vulnerable in those parts receptive to frequencies between 2500 and 6000 c.p.s. Exposure to such noise causes a characteristic loss in the audiometer readings near the 4096 c.p.s. level (the so-called "C.5 Dip" of early "acoustic trauma"). The "dip" may be nearer the 3000 c.p.s. mark and may not be detected without the use of a "continuous sweep" amplification dial (Robin, 1952). The degree, or amount, of hearing loss that may occur is discussed later. The effects of ultrasonic waves on the cochlea will not be considered. Up to the present time these are not fully understood.

Susceptibility.—The susceptibility of persons exposed to noise varies tremendously. There

are no certain reasons for this, though some relatively minor ones are known. These are:—

a. *Age*.—As a rule, older persons are more susceptible than young.

b. *Health*.—Debilitated and tired persons are more susceptible.

impossible or impractical, then testing should be done whenever any symptoms are complained of that denote possible damage, i.e., deafness, tinnitus, persistent discomfort, or pain. The actual length of time between periodic testing must be determined according

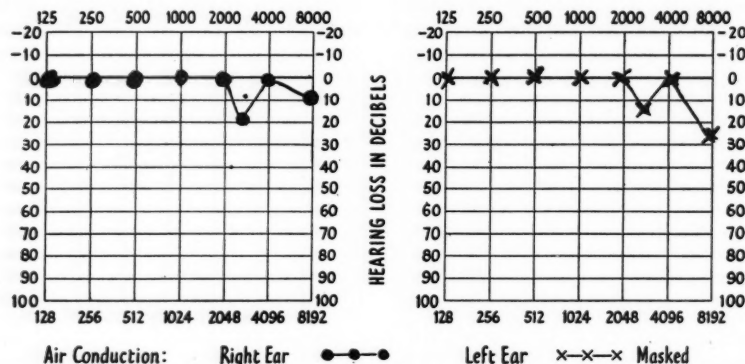


Fig. 3.—Audiogram (May 6, 1959). Dentist, aged 43. (Note loss at 3000 c.p.s. for both ears.)

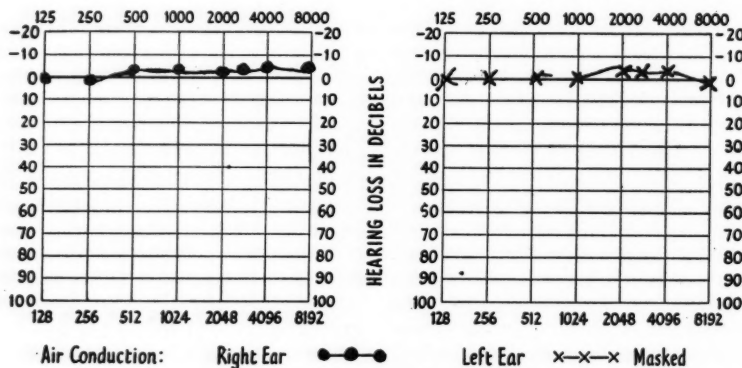


Fig. 4.—Audiogram (July 15, 1959). Same patient. (Normal graphs. See text.)

c. *Persons with certain ear conditions*, such as otosclerosis and nerve deafness.

d. *Sex*.—One American authority states that preliminary data on permanent loss seem to indicate less loss in women in comparative circumstances (Glorig, 1959).

The susceptibility factor is such an important one that with each "conservation of hearing programme" each person should be "screened" before exposure, and at regular intervals. If preliminary examination is

to circumstance. Unfortunately, there is, as yet, no reliable predictive test for susceptibility, owing to the variation of individual differences of "auditory fatigue" at different frequencies (Larsen, 1953).

DEGREE OF HEARING LOSS CAUSED BY NOISE

The amount of deafness caused by noise varies enormously, depending on the factors already mentioned. In the initial stages, it

will not be at all obvious clinically—only a slight difficulty in hearing a whispered voice, a faint watch ticking, a bird or cricket. The audiograph will, however, show a “dip” of about 15–20 dB somewhere between the 2048 and 4096 c.p.s. frequencies (Fig. 1). In some patients there may be a gradual progressive slope down to the 8192 c.p.s. frequency (Fig. 2). With increasing exposure, the loss may progress even to about 50 dB at 4096 c.p.s. and 80 dB at 8192 c.p.s. (Fisch, 1957).

NOISE OF DENTAL TURBINE DRILLS

As mentioned already, no evidence appears to be available of the effect of the noise of these drills on the hearing of dentists. Observations have been made, however, about the subjective sensations in dentists and patients. It has been noted (Vale, 1959) that “the noise factor with these machines (when run at 250,000 r.p.m.) is a disadvantage which will no doubt be overcome, at least in part, by the manufacturers in due course”. One dentist (Probert, 1959) noted that his work on children was as good when the machine was run at 100,000 r.p.m., while the high-pitched “whine” was avoided. The manufacturers, however, appear to advocate a speed of at least 250,000 r.p.m.

It is known that dentists are using the drills for varying lengths of time each day, and on each patient: many more, apparently, using them for appreciable lengths of time, with little or no regard to “rest” periods. The need for a “conservation of hearing” programme was forcibly brought to the notice of the writer by the complaint of a particular dentist.

CASE REPORT

Mr. X (aged 43 years). (Seen on May 6, 1959).—After having a turbine drill for a week and using it sparingly, he complained of persistent pain in both ears. No tinnitus and no apparent deafness. There was no previous history of ear trouble and no family history of deafness. He had not previously noticed any abnormal sensitivity to noise. He admitted that he was tired and overworked. Examination revealed no physical signs except a bilateral hearing loss of 20 dB in the right ear, and 15 dB in the left ear, both at the 3000 c.p.s. frequency (see Fig. 3). Rest from using the drill was advised. He was also asked to wear rubber ear-plugs.

Re-testing was not possible until July 16, 1959. He had acquired a “quieter” machine, used it less, and worn ordinary wool as ear-plugs. He had felt “much better” quite quickly, but later had been “worried” by the noise again. Testing showed a normal audiograph (Fig. 4). He was asked to have a further test in six months’ time.

This experience initiated the carrying out of a short analysis of the noise of turbine drills.

ANALYSIS OF THE NOISE OF TURBINE DRILLS

Tests were made on the “heads” of four different models (A, B, C, and D) of turbine drills. In each, the speed was run at 250,000 r.p.m. The distance from the “head” to the noise-level meter was 12 in. (This was considered to be the average distance between a dentist’s ear and the patient’s tooth.)

Analysis of the frequencies of the noise generated showed that there were, in fact, three components—at 5500, 4000, and 2400 c.p.s. The level of noise of these three differed, i.e., 80 dB, 60 dB, and 60 dB. (In one drill the 4000 c.p.s. gave an 80 dB level.) This shows that the 4000–5000 c.p.s. frequencies do tend to reach an “injurious” level.

The subjective effect of the drill noise was interesting. There was no doubt that one—model C, at 40 lb. pressure—caused quite marked pain in the writer’s ear. Model A caused slight pain, while models B and D caused no pain. The length of exposure was the same in each case.

This brief test gave the impression that the noise level of high-speed drills is such that, without any precautions, some dentists may gradually get permanent cochlear damage. The manufacturers should ensure that such a drill does not exceed a noise level of about 75 dB at 12 in.

PROPHYLACTIC MEASURES

These may briefly be summarized as follows:—

1. Reduce noise at source, i.e., choose a drillhead which does not have a very high noise level.
2. Work as far from the drill head as practical.
3. Have short periods of drilling, e.g., $\frac{1}{2}$ min., with long rest intervals (i.e., several minutes).

4. Dampen sound with absorbent curtains and carpets in room.

5. Wear special waxed wool, rubber ear-plugs, or "muff" ear defenders for the brief periods of actual drilling. Even ordinary wool may suffice.

6. Have screening audiometric hearing test for prediction of susceptibility.

The general conclusion is that if exposure is short and intermittent, there is little risk to the hearing of patient or dentist. If, however, there is excessive use, without intervals of rest, then certain persons may receive permanent damage.

Such a loss would be more easy to detect by measurement with an audiometer than personal or clinical tests. A warning sign might be given that toleration is severely taxed by a complaint of tinnitus (high-pitched). A mere feeling of brief discomfort or annoyance need not be a signal for anxiety. An increase in rest intervals would suffice to allay

damage except in the susceptible person. The latter would be advised to adopt strict precautions. If tests of hearing showed no improvement, or even a deterioration, such a drill should be avoided.

Acknowledgements.—The writer would like to express gratitude for the help given by Mr. G. H. Marrant, at the Eastman Dental Hospital, and Mr. J. J. Knight, of the Wernher Research Unit on Deafness.

REFERENCES

- FISCH, L. (1957), *J. Laryng.*, **71**, 846.
 GLORIE, A. (1959), *Noise Control*, **5**, 32.
 HOLT, E. E. (1882), *Trans. Amer. otol. Soc.*, **3**, 34.
 LARSEN, BORGE (1953), *J. Laryng.*, **67**, 536.
 MEYERICK, P. S. (1946), *Ibid.*, **61**, 248.
 PROBERT, B. T. C. (1959), *Brit. dent. J.*, **107**, 343.
 ROBIN, I. G. (1952), *Diseases of Ear, Nose and Throat* (Scott-Brown). London: Butterworth.
 RODGER, T. R. (1915), *J. Laryng.*, **30**, 91.
 SLAVIN, I. I. (1959), *Noise Control*, **5**, 44.
 SNOW, WM. (1959), *Ibid.*, **5**, 13.
 VALE, W. A. (1959), *Brit. dent. J.*, **107**, 333.

Pulpectomy in Young Permanent Incisors

Special attention is paid here to a simple method of filling the wide root canals of teeth with open apices and to obviating the necessity for the surgical approach. It is assumed that the maxillary central tooth is ready for the root-filling and has been X-rayed. The first step is to determine the point at which the root-filling is to terminate. The length of the tooth from incisal edge to the proposed terminal point is recorded. The terminal point may fall a little short of the root apex if the walls have a pronounced flare outwards, a condition found in very young teeth which are not very often involved in crown fracture. It is considered better to have a good seal a little short of the apex than a poor one at the flared apex.

The width of the canal is obtained from the radiograph, and a rod is made from warmed base-plate gutta percha which will fit the canal to within 2-4 mm. of the terminal point. The gutta-percha rod is made by rolling between two glass slabs. A "blank" can be so prepared before the appointment, kept in untinted

Metaphen, and finally rolled to shape between disinfected slabs, or slab and spatula. The fit of the rod or cone, considerably short of the apex at this stage, is verified by X-ray, after which it is cut to the recorded length of the tooth (incisal edge to proposed apical termination of filling). Now dry the canal, coat the walls with sealer to within 3 mm. of the apex, roll the cone in sealer, and force gently into the canal. It will project from the incisal edge by an amount equal to that by which it falls short of the apical termination. The amount of projection is measured and recorded. A warmed carver is used to cut off the cone in about the lower third of the pulp chamber. An orangewood stick is now put into the pulp chamber and abutted to the gutta-percha cone. The thumb-nail is placed even with the incisal edge and then slid back along the stick by the amount that the gutta-percha cone protruded. Force is now applied in an apical direction to seat fully the cone as indicated by the thumb-nail again coming even with the incisal edge. The result is verified by X-ray.—TEGART, R. L. (1959), *J. Canad. dent. Ass.*, **25**, 622.

THE USE OF ROTARY DIAMOND INSTRUMENTS IN GINGIVOPLASTY*

By W. M. OLIVER, B.D.S., L.D.S.

Periodontal Department, University of Liverpool

THE use of the rotary abrasive instrument in the preparation of the hard dental tissues is well known. Perhaps less familiar is the application of the rotary abrasive to the surgery of the gingiva and the contouring of the underlying bone.

Abrasive surgery of the soft tissues is not a new technique. The *Papyrus Ebers* (Bryan, 1930), written about 1500 B.C., contains details of techniques many centuries older, and indicates that the Ancient Egyptians were familiar with the abrasive use of powdered alabaster and pumice in the treatment of the spotty or blotchy complexion.

In recent years, Kromayer in 1929 described in his book on cosmetic skin treatment and scarless surgery an abrasive technique using a rotating dental bur on frozen tissue. The technique was modified by Iverson (1947), and more recently by Rosenberg (1952) and Strakosch (1953), who used carpenter's sandpaper wrapped around gauze rolls to eradicate traumatic tattoos of the face.

McEvitt (1950) reverted to the use of rotary abrasives, employing rotary disks, stones, and brushes in the treatment of the scars left by acne, and this technique was modified by Kurtin (1953), Burks (1956), Pegum (1957), and Wynne-Williams (1959), who used the abrasives on tissue frozen with ethyl chloride to provide anaesthesia, to decrease capillary bleeding, and to make the tissue more rigid and therefore less likely to distort under pressure of the abrasive instrument. They used a variety of instruments, including stainless steel wire brushes and steel toothed wheels, in the treatment of wrinkles, tattoos, and scars caused by acne, chicken-pox, and small-pox.

The rotary abrasive technique was not applied to periodontal surgery until 1955, when Fox, Walter, and Friedman described

its use in the contouring of the gingiva and alveolar bone. Other writers, including Goldman, Schluger, and Fox (1956), and Orban, Wentz, Everett, and Grant (1958), have also described this method.

It is well known that the normal anatomy of the gingiva is important in maintaining its health and normal keratinization and in preventing trauma. The gingival margin should terminate in a thin edge, closely adapted to the tooth and protected by the curvature of the crown, and there should be a well-marked concavity at the base of the interdental papilla. This shape ensures that food passing down the labial and lingual surfaces of the tooth is deflected over the relatively mobile gingival margin and papillae on to the well-keratinized attached gingiva. This gingival contour is not always present, deviation from this shape being caused by the anatomy of the supporting bone, by the arrangement of the teeth, or by hyperplastic or inflammatory changes of the gingiva.

Several methods have been described by which the final contouring of the gingiva may be carried out, including the use of knives, electrosurgery, electrocautery, and scraping the gingiva with a scalpel held at right angles to the tissue.

The technique to be described illustrates the use of the rotary diamond instrument in the contouring of the soft tissues, either alone or in conjunction with a gingivectomy, and to remove limited amounts of alveolar bone to improve the bone contour where it varies grossly from the normal and prevents the gingiva from assuming the desired shape.

INSTRUMENTS

The instrument is a modification of the standard dental diamond instrument. The grit of the ordinary dental diamond is designed for work on the hard dental tissue but is too fine for the abrasion of yielding soft tissues,

* Given at the meeting of the British Society of Periodontology held on January 11, 1960.

tending to burnish and burn them. In consultation with a firm of diamond instrument makers the grit was modified by etching the instrument between the grains of diamond. The coarse diamond is very effective in abrading the soft tissue, cutting rapidly with little pressure and having little tendency to drag or tear the attached gingiva.

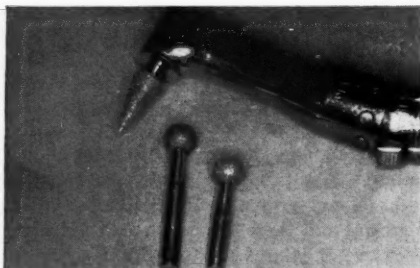


Fig. 1.—The modified conical (left) and round (right) diamond instruments with a miniature handpiece, compared to the standard round dental diamond instrument (centre).

Some difficulty was experienced in introducing normal conical diamond instruments into the interdental space from the apical direction because of the obstruction of the soft tissues of the lips or floor of the mouth, and therefore the length of the instruments was reduced to fit a miniature handpiece (Fig. 1). A conical and a small round instrument were thus adapted; but a useful addition would be a broad wheel diamond with rounded edges for use in a straight handpiece on the labial surface of the upper and lower gingiva.

TECHNIQUE ON SOFT TISSUES

The rotary diamond instrument works most efficiently on the firmer soft tissues. The firmer the tissue, the less it is distorted by the abrasive instrument, the greater is the "bite" taken, and the greater is the efficiency of the instrument. This is especially true of the relatively avascular fibrous tissue which is often the result of a long-standing chronic inflammatory process where local tissue resistance is high, of some types of gingival hyperplasia, and of the tough, firmly-attached fibrous tissue found normally around the gingival margin in the palate.

When the gingival tissue is soft, friable, and oedematous, it should be treated by the removal of local irritants and by the restoration of oral hygiene and physiotherapy to reduce the oedema and hyperæmia before using the abrasive technique. If these inflammatory changes persist in spite of the local treatment, contouring of the gingiva should be



Fig. 2.—The conical instrument in use on an interdental papilla which has not previously been treated by gingivectomy.

carried out by electrosurgery or electrocautery.

The diamond abrasive may be used alone to contour the gingiva where little or no pocketing exists, but where a bulk of tissue has to be removed because of pocket formation, this may be done less traumatically with the gingivectomy knife. Gingivectomy, however, frequently leaves the surface of the wound rather rough and lacerated and often fails to establish the ideal gingival deflecting surface. This may be corrected by subsequent contouring by abrasion.

The rotary diamonds are used with light pressure on the soft tissues, at maximum speed on the ordinary dental engine. A jet of sterile water, or normal saline, is essential to prevent clogging of the instrument and overheating of the tissues, with subsequent necrosis and ulceration. The instrument should be kept on the move to prevent digging in, and to blend the contour of one area with that of the next. The conical diamond is used first to produce steep concave well-defined slopes below the interdental papillæ (Fig. 2), and the round instrument is then used to produce the sharp edge of the gingival margin on the labial and lingual surfaces

(Fig. 3), the curvature of the stone imparting the desired bevel to the gingiva. Care is necessary to prevent abrasion of the tooth surfaces during this operation.

The direction of rotation is immaterial at the gingival margin, but Orban (1958) recommends that rotation should always be from the more firmly attached gingiva towards the



Fig. 3.—The round instrument in use on the gingival margin on the labial surface of 3|.



Fig. 5.—The condition two weeks after contouring the gingiva by abrasion.

less firmly attached alveolar mucosa when working near the muco-gingival line on all labial and buccal surfaces and on lingual surfaces of the mandible in order to prevent the alveolar mucosa heaping up in front of the stone and being torn.

When the soft tissues have been restored to an acceptable contour, any small tags of tissue remaining are removed by scraping gently with the edge of a knife or with a curette (Fig. 4). A pack of zinc oxide and eugenol and cotton-wool or ribbon gauze is inserted for seven days. Post-operative treatment is the same as that for a gingivectomy. Healing is rapid and the gingiva should

present a normal appearance within two or three weeks of removal of the pack (Fig. 5).

TECHNIQUE ON ALVEOLAR BONE

It is suggested that a permanent improvement in the shape of the gingiva will only be obtained if the underlying bone has a similar shape to that of the healed gingiva, and thus



Fig. 4.—The immediate post-operative result obtained by abrasion of the gingiva showing the matt velvety surface and well-accentuated contours.

the bone should taper labially and lingually to a thin margin, regularly scalloped around the necks of the teeth, and flowing smoothly from one tooth to the next with well-marked concavities running down from the interdental bone crest.

The shape of the alveolar bone may not conform to this ideal, because of irregularity in the dental arch, with the formation of a bony ledge on the labial aspect of a tooth in *linguo-version*.

Disease of the periodontal tissues results in craters in the interproximal bone, intrabony pockets, abrupt irregularities in the height of the bony margins around adjacent teeth, or wide bony ledges due to resorption of the slender lingual or labial plates of bone. These anomalies of shape may be treated by removing one of the sides of the interproximal crater to convert it into a long slope, thus restoring a steep deflecting surface. Self-cleansing contour may similarly be restored to the shallow, wide-mouthed intrabony pocket which does not respond well to attempts at reattachment, by reducing the higher bony wall to the level of the base of the intrabony

pocket and then sloping the bone labially and lingually. Irregularities of the bone margin may be adjusted to eliminate any abrupt change in contour, and wide ledges of bone may be abraded to a thin edge.

Diamond rotary instruments are used to contour bone in exactly the same way as they are used in the surgery of the soft tissues.



Fig. 6.—The result three weeks after osteo-ectomy and osteoplasty by abrasion using the flap approach. There is some loss of height of the gingival margin around $\overline{32|23}$, but although no gingivoplasty has been carried out the gingival contour is acceptable.



Fig. 8.—The condition three weeks after osteoplasty using the modified flap approach after gingiv-ectomy. A gingivoplasty will be necessary to establish an acceptable gingival shape.

Where any appreciable bulk of bone has to be removed, it should be done with a chisel or surgical drill, and the contouring carried out by the diamond instrument. Light pressure with high speed is used, and a jet of sterile water or normal saline is essential to wash away bone debris and prevent clogging of the instrument, with consequent eburnation of the bone, overheating, and necrosis, and sequestrum formation.

Access to the bone may be achieved directly or by means of a flap operation. The direct

approach is indicated where minimal bone contouring is required in a circumscribed area. In this method the stone is applied to the gingiva and allowed to abrade through it down to bone, which is then contoured to the correct shape. The exposed bone is covered by clot and allowed to heal under a periodontal pack by granulation and ingrowth of



Fig. 7.—Reflection of the mucoperiosteum after gingiv-ectomy to allow access to the alveolus by the modified flap approach.

epithelium from the wound margins. The method, though it leaves an untidy immediate post-operative result, is effective and is very useful in these cases in which a broad shelf of bone is found to interfere with the establishment of a steep deflecting surface.

The flap approach may be employed where contouring has to be carried out over a unit of several teeth. An incision is made through the base of the gingival sulcus of the teeth involved, the area being extended to give adequate access, and vertical incisions are made from one or both ends of this incision to the muco-buccal reflection to outline a flap of mucoperiosteum which is retracted to expose the bone. After the bone has been contoured the margin of the flap is trimmed to fit as accurately as possible around the necks of the teeth and its under-surface carefully curetted to remove any epithelial down-growth. The flap is secured with sutures and protected by a periodontal pack. Pack and sutures are removed after seven days (Fig. 6).

A modified flap approach may be used in which the vertical incisions are omitted, a shallow flap being pulled aside to expose the bone margin. This approach is often used in

conjunction with a gingivectomy by inserting a periosteal elevator at the gingival margin after gingivectomy to separate the muco-periosteum from the underlying bone (Fig. 7). The soft tissues are replaced after the bone has been contoured and are sutured into position and packed (Fig. 8).

The shape of the gingiva is often poor after these two methods of approach because it is impossible to trim the gingival margin accurately to the necks of the teeth after removing the bone. A gingivoplasty is therefore often necessary to restore an acceptable gingival contour.

Any of these approaches may be used in conjunction with a gingivectomy carried out immediately before bone surgery is undertaken, and the most satisfactory results have been obtained by eliminating gingival pockets by gingivectomy followed where necessary by immediate bone contouring, using the modified flap approach, and adjusting the contour of the gingiva three or four weeks later by gingivoplasty. The essence of the technique, however, is the rotary abrasive diamond instrument, and the ease with which contouring is carried out with an instrument familiar to most dental surgeons.

SUMMARY

The development of dermabrasion is briefly reviewed.

Early Second Permanent Molar Extractions in Orthodontics

In some cases of malocclusion requiring tooth extraction because of insufficient basal bone or lack of dental arch length, the sacrifice of premolars has certain disadvantages. These are the production of a flattened or "dished-in" appearance of the mouth or diastemas between the anterior teeth. In many of these cases the extraction of second permanent molars completely eliminates these two problems. The extraction of these teeth, if any extraction is indicated, is very desirable in deep overbite cases. The invariable tendency to incisor overlap is thereby lessened. There is a tendency in the opposite direction if first premolars are removed.

A technique is described in which the gingiva and alveolar bone are contoured by abrasion with rotating diamond instruments. A modification of the standard dental diamond instrument is described for use with this technique.

Acknowledgements.—I wish to thank Professor E. D. Farmer for his helpful advice and criticism and Mr. J. S. Bailie, of the Photographic Department, for his patience and co-operation in photographing these cases.

REFERENCES

- BRYAN, C. P. (1930), *The Papyrus Ebers* (Geoffrey Bles).
 BURKS, J. W. (1956), *Wire Brush Surgery*. Springfield, Ill.: C. C. Thomas.
 FOX, L. (1955), *Oral Surg.*, **8**, 1134.
 FRIEDMAN, N. (1955), *J. Periodont.*, **26**, 257.
 GOLDMAN, M. M., SCHLUGER, S., and FOX, L. (1956), *Periodontal Therapy*. London: Henry Kimpton.
 IVERSON, P. C. (1947), *Plast. and reconstr. Surg.*, **2**, 427.
 KROMAYER, E. L. F. (1929), *Die Behandlung der kosmetischen Hautleiden unter besonderer Berücksichtigung der physikalischen Heilmethoden und der narbenlosen Operationsweisen*. Leipzig: George Thieme.
 KURTIN, A. (1953), *Arch. Derm. Syph. (Chicago)*, **68**, 389.
 McEVITT, W. G. (1950), *J. Amer. med. Ass.*, **142**, 647.
 ORBAN, B. J., WENTZ, F. M., EVERETT, F. G., and GRANT, D. A. (1958), *Periodontics*. London: Henry Kimpton.
 PEGUM, J. S. (1957), *Proc. R. Soc. Med.*, **50**, 607.
 ROSENBERG, W. A. (1952), *Arch. Derm. Syph. (Chicago)*, **65**, 466.
 SCHLUGER, S. (1949), *Oral Surg.*, **2**, 316.
 STRAKOSCH, E. A. (1953), *Arch. Derm. Syph. (Chicago)*, **67**, 53.
 WALTER, M. (1955), *Dent. Practit.*, **6**, 40.
 WYNN-WILLIAMS, D. (1959), *Brit. J. plast. Surg.*, **12**, 170.

The ideal time at which to extract second permanent molars is when the X-ray survey shows little or no root development of the third molars. If the crown only of a third molar is fully formed in its crypt, the whole structure seems to slide mesially with a minimum loss of its vertical axial position after the extraction of the second molar.

Of course, before any extractions are decided upon, a complete survey must show whether or not any teeth are already absent. The line of treatment usually eliminates the possibility of third molar impactions.

Satisfactory results of treatment are shown pictorially in the text.—HALDERSON, H. (1959), *J. Canad. dent. Ass.*, **25**, 549.

THE CERVICAL AMALGAM RESTORATION AND ITS FAILURE

By G. F. KANTOROWICZ, B.Sc., B.D.S., L.D.S., R.F.P.S.
Royal Dental Hospital, School of Dental Surgery (University of London)

INTRODUCTION

FAILURES of amalgam restorations and cavity preparation are the subject of a large part of the dental literature, and an excellent report was given by Healey and Phillips (1949). Unfortunately, a detailed analysis of Class V restorations cannot be found, and in view of the large number of failures of these restorations it was decided to investigate their exact proportion and possibly suggest a remedy.

MATERIAL AND METHOD

All Class V restorations in patients presenting themselves for the first time at this

faults were noted, the critical one was taken as the sole criterion of failure.

RESULT

It was noted that only a quarter of all Class V restorations seen were adequate, and that most of the remainder required replacement, if the strict criteria of satisfactory restorations, from the point of view of being edge-free, smooth, well condensed, and free from marginal caries, were maintained.

Fig. 1 gives a detailed picture of the satisfactory and defective restorations. The total number of restorations seen was 200.

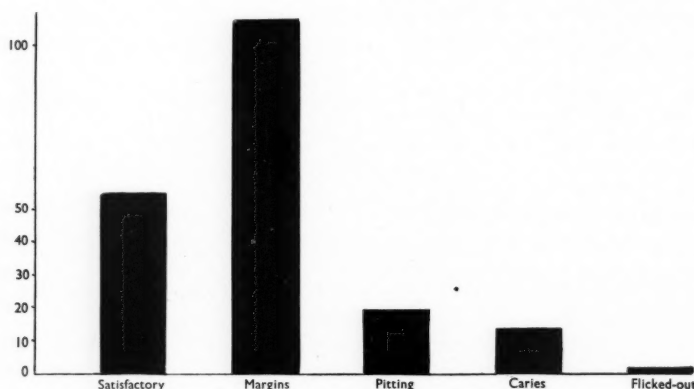


Fig. 1.—Two hundred Class V restorations were recorded, of which only 55 were satisfactory. The remainder showed marginal failure, pitting, secondary caries, or could be flicked out.

school were seen and examined. Only those restorations completed at least 6 months previously were noted and classified. A restoration with smooth surfaces, no pitting, and no edges either subgingivally or supragingivally was regarded as satisfactory, whilst others such as restorations with edges, marginal secondary caries, pitting, and those which could be flicked out with the probe were regarded as failures. Where two or more

DISCUSSION

The fact that three-quarters of all Class V restorations seen were unsatisfactory is of great importance when one considers that the preparation and filling of such cavities are a comparatively easy procedure.

The question is, Where to look for the fault? Oral hygiene certainly plays an important part when considering failures. A poor oral hygiene must always be considered a

predisposing cause. No doubt, some failures are due to faulty cavity preparation and under-extension for the prevention of further caries. However, the largest proportion is due to marginal failure. This group includes overhanging margins. Pitting of the amalgam is a sign of under-condensation, and a common fault in cavities where the condensation has to be carried out on a fairly convex surface. Dealing with the failures in order of occurrence, one can suggest under-extension, water contamination and lack of retention, lack of condensation, faulty finishing and polishing of the margins as the main faults, in that order.

Gabel's Hypothesis.—A. B. Gabel (1954) writes that the Class V restoration in mandibular teeth may be displaced by the component of force from the lingual slopes of the buccal and lingual cusps of the maxillary teeth acting on the buccal slopes of the buccal and lingual cusps of the mandibular teeth when the teeth are in centric occlusion.

According to him, the tooth being subjected to a transverse force tends to bend in the same manner as a beam similarly loaded. A cavity cut in this area would increase the deflexion. This deflexion would then cause a gap of some microns between tooth and restoration. An "opening-up" of the cavity in maxillary teeth would not occur because these are under compression when in centric occlusion (Fig. 2).

This hypothesis attributes to the enamel a degree of elasticity it does not possess, and it makes no allowance for the displacement of the whole tooth within the limits of the periodontal membrane. Furthermore, if it was correct we would see many more failures in mandibular Class V restorations than in maxillary Class V restorations.

An analysis of all Class V restorations seen shows that the ratio of maxillary to mandibular restorations is 1 : 3. The ratio of failures in mandibular and maxillary teeth is the same. Failed mandibular Class V restorations appear more numerous than maxillary ones because many more Class V mandibular cavities occur in the average mouth, and not because of the mechanical and biological principles which Gabel attributes to these teeth and their movements.

The cavity preparation must be carried out according to Black's principles, with the gingival wall of the cavity in relatively caries-immune areas to avoid secondary caries and marginal failures. The floor of the cavity should be equidistant from the surface of the enamel and just penetrate the dentine, except

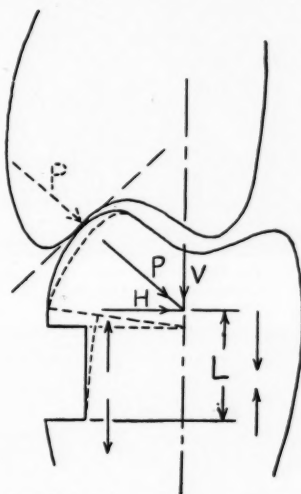


Fig. 2.— P = the force normal to the tangent at the point of contact. H = the component perpendicular to the long axis of the tooth. V = the axial component of force P . (According to Gabel the cavity will open when force P is applied.) (From Gabel's "American Textbook of Operative Dentistry", reproduced by kind permission of Henry Kimpton, London.)

where removal of caries requires part of the cavity to be deepened.

Neglected oral hygiene must be considered a predisposing cause for failures, and the patient should be instructed accordingly.

Faulty edges must be removed at the next visit with finishing burs, hand instruments, and sandpaper disks. The margins must be well polished. Water contamination and under-condensation are the main causes of pitting of the amalgam. Water can be excluded from most cavities by the use of cotton-wool rolls, matrix bands, or a rubber dam.

Moisture can be very troublesome and is a large factor in failures. Astringents are usually of great help in reducing marginal seepage. Even strong escharotics need not cause tissue

damage to any great extent; they do not penetrate deeply, as the alkaline plasma neutralizes the acid. Ten per cent zinc chloride, fifty per cent trichloroacetic acid, or a strong solution of adrenaline applied to the

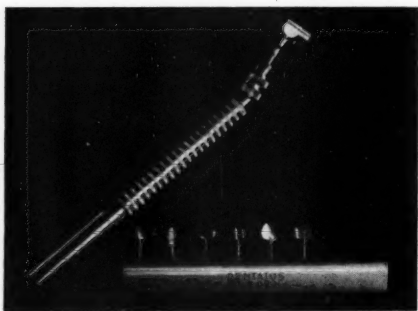
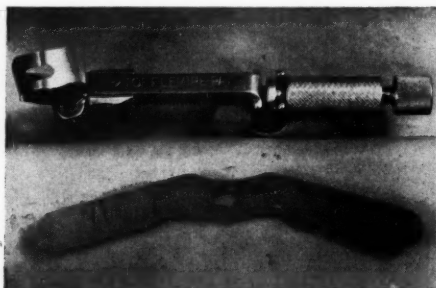


Fig. 3.—The Dentatus amalgam condenser and some types of heads.

to the tooth, and a flap raised which will expose part of the neck of the tooth. After the filling is completed the flap is replaced, and can be stitched if necessary. This is, however, only necessary in extreme cases and a small intra-papillary injection will reduce any tendency for a hæmorrhage to obscure the field.

The gingival hæmorrhage which often occurs when preparing the gingival part of the cavity can often be prevented by the use of a slowly rotating round bur. Inverted cones and fissure burs cause more soft-tissue damage. When the cavity is completed, and water seepage or hæmorrhage can still not be controlled, a temporary filling should be inserted. This will also simplify the management of the soft tissue at the next visit.

A rubber dam can often be applied to the



A



B

Fig. 4.—The Tofflemire matrix holder with the "window" type band applied to the tooth. The window is slightly smaller than the cavity. A, General view of holder and band. B, Band applied to the tooth.

gingiva with a blunt plastic instrument will not only decrease or altogether stop this marginal seepage, but will also push the soft tissue away from the cavity edge.

The cavity can sometimes be isolated by rubber dam. Alternatively, the soft tissue can be cut away. This is done either by removing it under local anæsthetic, in the same manner as a gingivectomy, or the excess soft tissue may be removed with a sharp excavator. This latter method is only suitable, however, for small amounts of soft tissue encroaching on the cavity margins. Should the cavity be deep and well under the gum margins, a small vertical incision can be made mesially or distally

tooth, after the gum has been removed either by cutting it away entirely or by raising a flap.

Condensation of amalgam on a convex surface is difficult, but when the Dentatus amalgam condenser is used with the concave heads a good result can be obtained (Fig. 3). I found the Tofflemire matrix holder with the "window" type band most suitable for this type of cavity. The window is cut so that it is a little smaller than the cavity, to provide a firm wall against which the amalgam is condensed. This is especially good for the rather large convex cavity where difficulty is encountered when condensing the mesial and distal

margins. The matrix band also pushes the gingiva away from the cavity, even when subgingivally placed (Fig. 4).

A well-condensed and well-polished Class V amalgam restoration will last years, and as much effort and proportional amount of time should be spent on its preparation as is done on the more extensive restorations.

SUMMARY

Out of 200 Class V amalgam restorations seen, only a quarter were satisfactory. The

faults are analysed and possible remedies suggested.

Acknowledgement.—I should like to thank Mr. Shilland of the Photographic Department of the Royal Dental Hospital for the help he has given me in the production of this article.

REFERENCES

- GABEL, A. B. (1954), *The American Textbook of Operative Dentistry*, 213. London: Henry Kimpton.
HEALEY, H. J., and PHILLIPS, R. W. (1949), *J. dent. Res.*, 28, 439.

THE SCREW AND HINGE APPLIANCE

By J. POUSTIE, L.D.S.

Orthodontic Department, Glasgow Dental Hospital and School

THE treatment of the condition for which this appliance was designed is one in which it is usually considered best to use a fixed appliance.

Treatment of anomaly by fixed appliance is complicated and time-consuming, whereas the screw and hinge plate, which is the subject of this paper, is simple, and the time at the chairside merely involves the taking of impressions.

The appliance is especially useful in the treatment of cases of the Class II, division 1 order, where the condition is still further complicated by loss of space by either one or sometimes both lower second unerupted premolars. Where there is a unilateral loss of space and a midline shift to that side, this may also be corrected by the appliance.

The screw and hinge plate is a modification of the Schwarz appliance and has been in general use for three years. The appliance does not cause the tissue disturbance which occurs when an attempt is made to gain space for an unerupted lower premolar using the orthodox screw plate with the small movable distal section.

Considering the treatment of a case using fixed appliance, the disadvantages are: (1) It may not be possible to attach bands to the first permanent molars because of the erupting second molars. (2) Bands may have to be

removed because of erupting second molars when the treatment is only partly carried out.

Valuable time is lost and the anomaly may then have to be accepted and treatment which

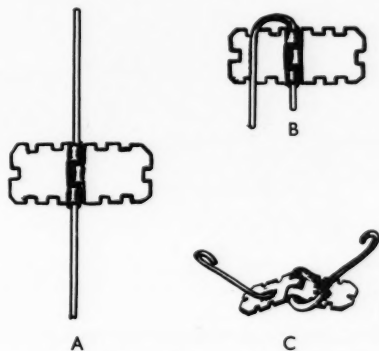


Fig. 1.—A, The two halves of the hinge are held together by a long piece of wire. B, The wire is bent and soldered or welded to the face of the one flange. C, The wire is now bent out at an angle to this flange, and another piece of wire of the same diameter is attached to the other flange.

is not ideal carried out, viz., extraction of either one or two lower premolars.

The screw and hinge plate has the advantage that treatment may be carried out irrespective of the eruptive level of the lower second permanent molar.

The distal movement of a lower molar tooth is one of the most difficult tooth movements to achieve and some orthodontists even doubt the possibility of doing so.



Fig. 2.—Model showing a plate waxed-up prior to flasking.

Assuming that there is no such distal movement, or very little, the only movement taking place being that of the teeth medial to the unerupted tooth, this appliance is designed

to rivet both ends. This problem was overcome by inserting a long piece of wire through the hinge instead of using a short pin. This wire was then bent, as shown in Fig. 1.

The hinge is made from stainless steel plate, gauge 26. Round hard tempered stainless steel wire 0.7 mm. is used for the pin. The two protruding lengths of wire are used to facilitate the flasking and packing of the appliance. The free ends are embedded in the plaster so that the hinge cannot move during packing. Fig. 2 shows a plate waxed-up prior to flasking, with the free ends protruding from the surface of the wax. The screw is placed as for an ordinary screw plate.

When the appliance has been processed, the free ends of the wires are cut off, stoned down and smoothed or countersunk, and filled in with quickset plastic.

After the appliance has been worn for about two weeks, a saw cut is made in the plastic at the pivot as is done for the screw. It should be

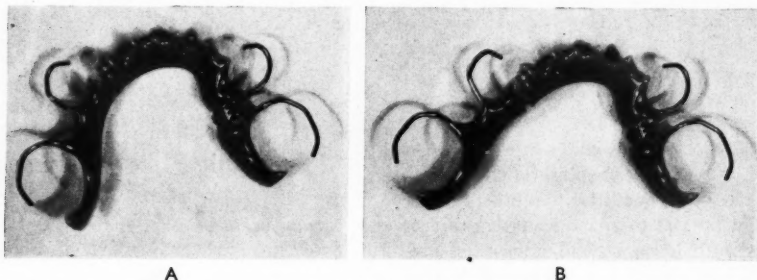


Fig. 3.—A, An appliance cut at the pivot, B, Showing the free buccal movement of the section of the plate distal to the hinge.

to allow the anterior part of the arch to move more freely.

Freedom of movement is achieved by incorporating in the appliance a pivot which is in the form of a hinge. It has been found by trial that the canine region is the most advantageous position for placement of the pivot.

When this plate was first designed, great difficulty was experienced by the hinge coming apart. The hinge must be kept small, because of the limited lingual depth, and as the steel centre pin was short it was impossible

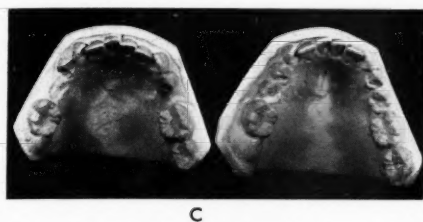
noted, however, that the efficiency of the appliance is dependent on regular trimming of the plastic at the pivot on the fitting surface of the appliance on either side of the cut. If clearing of the plastic is not carried out, the action of the plate will then be similar to that of the orthodox screw plate and there will be no swinging action of the anterior section.

Fig. 3 A shows an appliance cut at the pivot, and Fig. 3 B illustrates how freely the small section distal to the hinge can move buccally, but there is limited lingual swing possible

because the saw cut is fine on the polished side of the plate.

Fig. 4 A is a buccal view of a case where there was loss of space for $\overline{5}$. Treatment was carried out using an upper plate to correct the incisor position. This appliance also had an anterior biting platform to undo the locking of $\overline{4}$ and $\overline{4}$ during treatment. A lower screw and hinge plate was inserted (Fig. 3 A). Fig. 4 B shows the buccal view after treatment, Fig. 4 C

lower anterior segment. The upper arch was narrow and "V" shaped. Right and left buccal segments before and after treatment are



C



A

B



D

E

Fig. 4.—Model showing loss of space for $\overline{5}$. A, Before treatment with lower screw and hinge plate (buccal view); B, After treatment (buccal view); C, Models showing occlusal view before and after treatment; D, E, Models showing the correction of the midline deviation in this case.

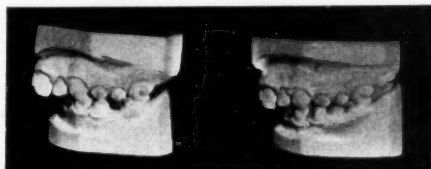


Fig. 5.—Models showing right and left buccal segments before and after treatment, in a case where space was created for $\overline{5}$, and the collapsed lower anterior segment corrected.



A

B

Fig. 6.—A, Model showing occlusal view after treatment, B, Model showing occlusal view before treatment.

occlusal views before and after treatment. It was previously mentioned that it was possible to correct a midline deviation in a case such as this, and this is indicated in Figs. 4 D, 4 E.

In the next case there was bilateral loss of space for $\overline{5}$ and a resultant collapse of the

illustrated in Fig. 5. Treatment consisted of an upper expansion plate with a distal tie and the appliance also carried an anterior biting platform to unlock the occlusion. A lower screw and hinge appliance was inserted to gain space for $\overline{5}$. When this phase had been completed a similar lower appliance was inserted to create space for $\overline{5}$. Figs. 6 A, B show the occlusal views before and after treatment.

Acknowledgements.—My thanks are due to Dr. T. C. White and Mr. H. A. Anderson for the encouragement and advice given whilst this appliance was being developed, to Mr. N. R. Robertson and Mr. H. Noble for the photographs, and to Messrs. Torrance and Wilson for models and appliance preparation.

NEW MATERIALS AND APPLIANCES

THE new materials and appliances briefly reported here have recently become available to the profession. For further information the reader should write direct to the manufacturer.

Tungsten Carbide Instruments

THE successful application of tungsten carbide for dental cutting instruments with its well-appreciated qualities of sharpness and extreme hardness has now led to the adaptation of



further patterns which have been known to the profession for many years.

The original tungsten carbide tipped periodontal hoes are now followed by two further double-ended gingival margin trimmers (Blacks TC.77/78 and TC.79/80) at 28s. each, and six single-ended curettes (McCalls TC. 2L, TC. 2R, TC. 4L, TC. 4R, TC. 13, and TC. 14) for the removal of fine calculus deposits below the gingival margin at 19s. 3d. each. (Amalgamated Dental Trade Distributors Ltd., 26-40 Broadwick St., London, W.1.)

Opticlar

AN antiseptic and non-toxic surface reducing agent, Opticlar applied to the mouth-mirror prevents misting and obscurity from water spray on high-speed equipment. (James Rouse Ltd., Sheffield 1.)

Zactirin

A NEW orally effective analgesic, being a compound of ethoheptazine citrate and aspirin. It is reported to cause less post-operative

nausea and have fewer side effects than codein-aspirin compounds. It is recommended for the relief of pain following oral surgical procedures. (John Wyeth & Brothers Ltd., Clifton House, Euston Road, London, N.W.1.)

Multi-fired Porcelain Anterior Teeth

THE Myerson Tooth Corporation has introduced a new range of anterior teeth in multi-fired porcelain known as Myerson's New Aesthetic Anteriors. (Available from all Dental Houses. Sole Agents for U.K.: James Rouse Ltd., Sheffield 1.)

Throsil Lozenges

THE wide range of antimicrobial activity of Throsil lozenges indicates their use in irritations and infections of the mouth and throat. Each tablet contains cetyl dimethyl benzyl ammonium chloride and amethocaine hydrochloride. The combination of a quaternary ammonium antiseptic with amethocaine provides a powerful antimicrobial effect together with effective local analgesia. Basic cost: 1s. 6d. for 20 lozenges. (Allied Laboratories Ltd., 140, Park Lane, London, W.1.)

Strepsils Lozenges

A NEW type of antiseptic lozenge, Strepsils, contains dybenol (2 : 4 dichlorobenzyl alcohol) and amyl-meta-cresol in an aromatic, soothing base. They are effective against a wide range of bacteria and fungi. Indications include glossitis, stomatitis, aphthous ulceration, and following dental extractions. Basic N.H.S. price: 1s. 9½d. per tin of 24 lozenges. (Boots Pure Drug Co. Ltd., Nottingham.)

Silicate Cement

AN improved silicate cement, True-shade, has a stiff mix to aid pulp protection. It is fluorescent and is offered in a colour-balanced shade range, which obviates the use of blenders. (Manufactured by Dental Fillings Ltd., 49 Grayling Road, N.1.)

BOOK REVIEWS

A SYNOPSIS OF PHARMACOLOGY. With Special Application to Dentistry. By V. C. SUTHERLAND, Ph.D., Assistant Professor of Dental Pharmacology, University of California Medical Center. $9\frac{1}{4} \times 6\frac{1}{8}$ in. Pp. 267+viii with 7 illustrations. 1959. Philadelphia and London: W. B. Saunders Co. Ltd. 28s.

ALTHOUGH written primarily for dental students, this *Synopsis of Pharmacology* has much to recommend it to both dental and medical students. It covers most of the subject in a concise and dogmatic way, which will appeal to those who prefer their books in lecture-note form. To this end any suggestion of a historical approach is ruthlessly avoided and conflicts of opinion about the action of drugs are not quoted. As a consequence, the text is not interrupted by references to the literature, although each chapter ends with a short well-chosen bibliography. As is to be expected of a book written with the dental profession in mind, the chapters on local and general anaesthesia are good. Too many analgesic drugs are mentioned, perhaps, without sufficient detail concerning the more important ones; fourteen analgesic drugs are discussed in addition to the antipyretic group. Treatment of the pharmacology of the autonomic nervous system gains in clarity when presented in note form and in this chapter the simple diagrams are helpful. In dealing with the action of drugs on the heart, the brief account of congestive heart-failure is confused, but clarity is well restored when the individual drugs are considered. This is on the whole an excellent account of pharmacology and it is extremely reasonable in price. It is a pity that more medical and dental books cannot be produced with this economy. The reviewer is left with the regret that a few additional chapters on, say, drugs acting on the kidney, uterus, and alimentary tract were not included so that, being comprehensive, the book could be recommended to medical as well as dental students.

B. G. A.

ARCHIVES OF ORAL BIOLOGY—Volume 1, No. 1 (August 1959). Published under the direction of an Honorary Editorial Advisory Board (Joint Chairmen: F. A. ARNOLD, jr., Bethesda, and M. A. RUSHTON, London). $9\frac{3}{4} \times 7\frac{1}{4}$ in. Pp. 88. Illustrated. *Subscriptions:* for libraries, government establishments, and research institutions—£6 per volume; for individuals who write direct to the publisher and certify that the journal is for their personal use—£3 10s., per annum. New York and London: Pergamon Press Ltd.

THE introduction of a new journal in the field of dentistry is a rare event and is always to be welcomed.

The *Archives of Oral Biology*, as the title implies, is a journal in which will be published original research communications in the oral-biological field. As the foreword states, hitherto much work of interest has perforce been published in a variety of journals all over the world. It is to fill the need for an additional international scientific journal in which papers can be speedily published in either English, French, or German that this new journal has been introduced.

As would be expected in a journal of this character, the production is of a high standard, particularly of photomicrographs where accurate detailed reproduction is so essential.

The journal is being directed by an International Editorial Board, the joint chairmen being Dr. F. A. Arnold of Bethesda, U.S.A., and Professor M. A. Rushton of the University of London.

The Regional Editors include Professors A. E. Miles and I. Kramer, and there is an Honorary Advisory Board which gives a very wide international coverage to the journal. Owing to its highly scientific character and very high price, it will only reach a very small section of the dental profession, but it will be reassuring to the general practitioner to know that such an amount of research work is being carried out throughout the world as to justify the production of a second

international research journal. It will not only contribute greatly to the fund of scientific knowledge, but will be of material benefit to dentist and patient alike. The whole profession will wish this venture success. D. F. S.

LABORATORY MANUAL OF BIOLOGICAL CHEMISTRY FOR STUDENTS OF DENTISTRY. By WALTER C. HESS, Ph.D., Assistant Dean and Professor of Biological Chemistry, Georgetown University School of Medicine and Dentistry, Washington, D.C., and JOSEPH C. MUHLER, D.D.S., Ph.D., F.A.C.D., Professor of Basic Sciences, Indiana University School of Dentistry, Indianapolis. $8\frac{1}{2} \times 5$ in. Spiral binding. Pp. 118. 1959. St. Louis: The C. V. Mosby Co. (London: Henry Kimpton). 16s. 6d.

THIS little volume is written by authors who both teach dental students and do research in the dental field. There are a number of useful class experiments on saliva and tooth substance which are not universally found in the pre-clinical courses in British Dental Schools. The manual will be useful to those teachers of biochemistry to dental students who are not intimately connected with dental science.

R. L. H.

PROTHÈSE DENTAIRE SQUELETTIQUE.

By J. ROUOT, Professeur à l'Institut de Stomatologie de la Faculté de Médecine de Paris; Chef de Travaux à la Faculté de Médecine de Paris; D.D.S. (Northwestern University, Chicago, U.S.A.). $8\frac{5}{8} \times 5\frac{3}{4}$ in. Pp. 133+ix, with 145 illustrations. 1959. Paris: Masson et Cie. 2200 fr.

PROFESSOR ROUOT begins his concise and clearly-written monograph by giving a definition of skeleton dentures, their indications and advantages.

He proceeds to the surveying of models for the construction of such dentures whilst stressing its importance and names a few types of surveyors such as Ney, Wills, and Devin.

There follows a description in detail of the denture clasp, giving the function of each part and its relation to the survey line on the teeth.

166

The various types of clasps of the Ney classification and also those designed by Roach are reviewed and it is clearly shown in which type of case they can be used.

The author passes on to the connecting bars, both palatal and lingual, stating their requirements.

From a combination of the classifications of partial dentures of J. Martin and Reckett, Rouot has produced his own classification.

In the second half of this monograph the author deals with the clinical and radiological examination of the teeth, the examination of the casts after they have been mounted on the articulator, and the preparation of the mouth.

He follows by outlining the various impression materials, naming their advantages and disadvantages, and briefly describes the impression-taking technique.

The subsequent operations which are carried out in the laboratory, namely wax-pattern making using preformed wax clasps and connecting bars, spruing, investing, and casting, are dealt with systematically and clearly.

The style throughout is economical and precise; the diagrams are numerous, self-explanatory, and simple, helping the reader to understand the technical details.

The content is presented systematically and should benefit the practitioner as well as the student.

J. M. J. L.

LETTER TO THE EDITOR

January 19, 1960.

Dear Sir,

I read with much interest your recent editorial on general anaesthesia in dentistry. I was impressed by the thoughts expressed on the subject. In 1946 I had similar feelings and instituted a one-year graduate training programme in general anaesthesia under the auspices of the School of Dentistry, University of Pittsburgh and University Hospitals. It is my belief that such a programme as this, is the answer for training in the future as it is now.

LEONARD M. MONHEIM.

Professor and Head of Department
of Anaesthesiology,

University of Pittsburgh School of Dentistry

The Presbyterian Hospital,
230 Lothrop Street,
Pittsburgh 13, Pa.

ABSTRACTS FROM OTHER JOURNALS

The Acute Periodontal Abscess

These often give rise to problems of diagnosis and a careful history-taking is required, together with a medical history, because serious systemic conditions may first be manifest in the periodontal tissues. The cause of the abscess is often obscure, although there is usually a mixed infection of oral organisms. A localized throbbing pain over 24 hours usually indicates pus under pressure, and this may occur either in the pulp or periodontal tissues. Degeneration and subsequent death of the pulp is a more common condition than a periodontal abscess, and the vitality of the tooth concerned must be checked. Swelling is usually present with these abscesses, but it will not be so if the abscess occurs at the bifurcation of roots. The tooth may not be tender to percussion.

The treatment of these abscesses is to establish drainage and to use antibiotics fully or not at all. Hot saline mouthwashes are useful; a tablespoonful of salt to a tumbler of water used 2-3 hourly over 48 hours and held on the inflamed part. Periodontal abscesses are described under four headings.

1. Periapical abscess—this is the most common type and is usually due to spread of infection from the root canal. The important diagnostic feature is that the tooth is non-vital. The pus may track facially or lingually or along the periodontal tissues to the gingival crevice. When drainage has been obtained, either via the root canal or by incision, and the acute phase is quiescent, a flap is made to expose the outer plate of bone and an operation is planned to include apicectomy, root filling, and root curettage.

2. Lateral periodontal abscess not involving the gingival crevice is the least common type. The abscess is located anywhere between the gingival crevice and the apical tissues. There is no pocket and the tooth is vital. The lesion is a small tender swelling, but if it is situated between the bifurcation of roots there will be intense throbbing pain and the tooth will be tender to percussion although

swelling will be absent. If such a tooth carries a restoration it will be difficult in the early stages to differentiate a periodontal abscess from acute pulpitis. However, in the latter case degeneration and necrosis of the pulp will soon follow and vitality tests will then be negative. A tooth with a periodontal abscess at the bifurcation of the roots usually remains vital unless the apical vessels are involved. The treatment of lateral abscesses consists in establishing drainage by incision and hot saline washes, followed by a flap operation and curettage of the intra-bony area to free chronically inflamed granulation tissue.

3. The lateral periodontal abscess involving the gingival crevice is a common type and is difficult to treat. Swelling and reddening of the gingivæ and the formation or presence of a pocket are the most constant findings. The intensity of the pain, the amount of bone loss, and mobility of the tooth will vary considerably from one case to another. It is difficult to decide on the best line of treatment; factors to consider are the general health and the state of the mouth. If drainage is adequate, hot mouth washes constitute the immediate treatment. Incision will be required if drainage is poor and when the acute phase has passed the area should be thoroughly curetted. The degree of success will depend on the amount of re-attachment of the deeper periodontal tissues.

4. Gingival abscess—this last type is not common and is usually due to trauma. The treatment of the tender swelling is incision and hot washes.—Trott, J. R. (1959), *Canad. dent. Ass. J.*, 25, 601.

Porosity in the Full Cast Crown

A "back pressure" porosity was noticed in cast gold crowns when using the hygroscopic technique and a number of casting variables were studied in order to determine the cause.

Among the variables studied were casting pressure, distance of pattern from end of mould, sprue length, position and gauge, the

investment, the gold alloy, the method of wax elimination, the temperature involved, and the method of casting.

The actual cause of the porosity was thought due to gas which was unable to escape quickly enough through the investment core inside a full crown pattern at the time of casting.

Sprue length, gauge, and direction had no effect on this type of porosity. No porosity, however, occurred with Cristobalite investment, with furnace temperatures over 1100°F.,

or with sufficiently high casting pressure (i.e., four turns of the centrifuge casting machine or a minimum of 20 lb. per sq. in. with air-pressure casting). Porosity was not eliminated by varying the temperature of the alloy, though use of a reservoir and positioning of the pattern $\frac{1}{4}$ in. from the base of the casting ring help to reduce it. The two major factors in causing this porosity are a low water/powder ratio and incomplete burn-out of the wax.—STRICKLAND, W. D., and STURDEVANT, M. (1959), *J. Amer. dent. Ass.*, 58, 69.

The British Society of Periodontology Scandinavian Symposium

April 4, 1960:

- 9.30 a.m. Professor Göte Nyquist (Umeå), "Bruxism and Periodontal Disease".
- 11.0 a.m. Dr. Ulf Posselt (Malmö), "Bite Guards, Bite Plates, and Orthodontic Treatment in Periodontal Disease".
- 2.0 p.m. Professor Jens Waerhaug (Oslo), "Dental Restorations as Aetiological Factors in Periodontal Disease".
- 3.30 p.m. Dr. Henry Beyron (Stockholm), "Occlusion".

April 6, 1960:

- 9.30 a.m. Professor Hilding Björn (Malmö), "Experimental Investigations on Reattachment".
- 11.0 a.m. Dr. Hölger Thilander (Umeå), "Some Structural Changes in Periodontal Disease".
- 2.0 p.m. Professor Johs. Juul. Holst (Copenhagen), "Operative Procedures in the Treatment of Periodontal Disease".
- 3.30 p.m. Dr. Nils Berghagen (Stockholm), "A Three-dimensional Radiographic Study of the Intra-bony Socket".

The cost of tickets for both days is 5 guineas (or 3 guineas if attending on one day only). Early application should be made to: P. J. Hill, 47, Montagu Mansions, London, W.1.

The Dental Implant Society of Great Britain

On Jan. 15, 1960, at the Royal Society of Medicine, Mr. Boris Trainin, Chairman, spoke on "Implant Experiences in America". Professor Talmage Read, President of the Society, who was in the Chair, stressed the necessity for further organized research into the subject of implant dentures, since up to now most research, both here and abroad, has been carried out by private dentists out of their own funds. Professor Read then spoke of the Research Trust inaugurated by Mr. Trainin, whose trustees included Professor Mathews, Sir Heneage Ogilvie, Lord Knutsford, Sir Denys Lowson, and himself, and expressed the hope that this project would speedily reach completion and that adequate funds and facilities would be made available in the near future.

New Dental Journal

A new scientific journal in the field of dentistry to be published quarterly by the University of Chicago Press will seek to bridge the gap between the research worker and the clinician. It will be titled, *Dental Progress*.

Appointment

Mr. John Vivian Bingay, M.B.E., L.D.S., at present Chief Dental Officer to the County Council of Middlesex, has been appointed Director of the Training School for Dental Auxiliaries with effect from April 1, 1960.

CONGENITAL PARTIAL AGLOSSIA

By J. H. GARDINER, B.D.S., D.Orth. R.C.S.

Senior Lecturer and Head of the Orthodontic Department, Sheffield University Dental School

As far as can be ascertained, only 10 cases of the condition of congenital absence of the anterior portion of the tongue have been reported from various countries as far back as 1718 (*Table I*). In 5 of the 10 cases reported the absence of the anterior two-thirds of the tongue has been accompanied by other anomalies such as cleft palate or absence of fingers or toes.

DEVELOPMENT

The anterior portion of the tongue begins as an enlargement of the tuberculum impar in

the central portion of the mandibular arch at about the fifth week or the 8.5-mm. stage of intra-uterine life. It has been suggested by Sinclair and McKay (1945), in their account of a patient with a similar aglossia, that at about the sixth week of intra-uterine life or at the 12-mm. stage, further development of the tuberculum impar ceased. In the case of their patient, who died 4 weeks after birth, they were able to confirm their suppositions by post-mortem examination; for instance the distribution of the fifth and twelfth

Table I.—REPORTED CASES OF PARTIAL AGLOSSIA

REPORTER AND COUNTRY	YEAR PUBLISHED	AGE OF PATIENT	OTHER ANOMALIES	SIMILAR CONDITIONS IN FAMILY	SPEECH	TASTE
Jussieu (France)	1718	9 yr.	Not reported	Not reported	Difficulty with c, f, g, l, n, r, s, t, x, y, and z in French	Normal
Spiller (U.S.A.)	1816	Infant, age not reported	Cleft palate	Not reported	Not reported	Not reported
Kettner (Germany)	1907	Child, age not reported	Cleft palate. All toes and some fingers	Not reported	Difficulty with some consonants	Not reported
Watkin (England)	1924	Child, age not reported	Partial anodontia. Reversal of viscera	Not reported	Difficulty with s, f, and x	Not reported
de Lamothe (France)	1930	Died at 3 wk.	Vertical membrane across mouth	Not reported	—	—
Rosenthal (U.S.A.)	1932	3 yr.	Partial anodontia. Cleft of lower lip. Absence of some fingers and toes	None	Not reported	Not reported
Sinclair and McKay (U.S.A.)	1945	Died at 4 wk.	Hare lip, cleft palate, webbing of fingers and toes	Not reported	—	—
Farrington (U.S.A.)	1947	22 yr.	Vertical fibrous cord in mouth	None	Difficulty with q	Normal
Dockrell (Eire)	1949	4 yr.	Partial anodontia	None	Rather thick	Not reported
Eskew and Shepard (U.S.A.)	1949	22 yr.	None	None	Difficulty with p, b, m, f, v, w, and sh	Soft palate only

Given at the Manchester meeting held on April 17, 1959.

cranial nerves in the tongue of their patient indicated agenesis rather than atrophy of the tongue.

PRESENT CASE

The case presented here was referred at the age of $5\frac{1}{2}$ years from the Speech Therapy Department of the Sheffield Children's

that she could not suckle and it was then that the absence of a tongue was discovered. The physical anomalies such as cleft-palate or missing digits which accompanied 5 of the 10 other cases reported were not present.

As in Rosenthal's patient (1932) this child was late in walking and in developing generally, for she is smaller even than her sister who is 15 months her junior. When this patient was younger, dry food especially used to collect in the vault of her palate and had to be

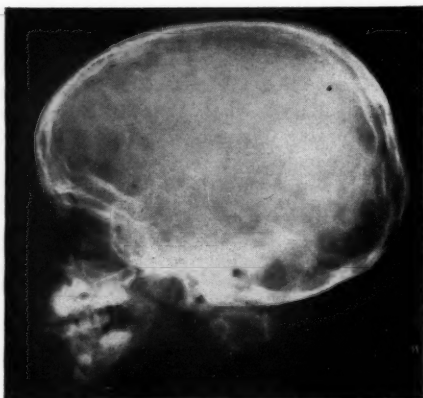


Fig. 1.—Lateral skull radiograph of the patient.

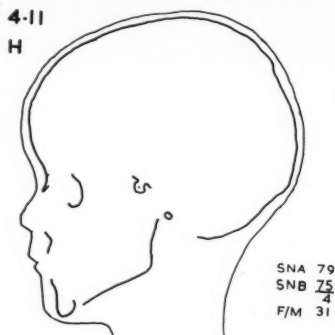


Fig. 3.—Tracing from the patient's younger sister's lateral skull radiograph.

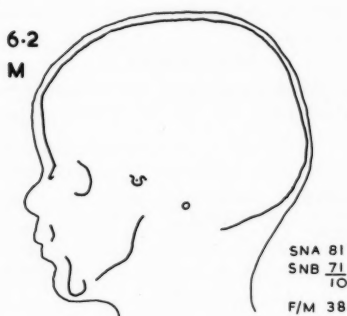


Fig. 2.—Tracing from patient's lateral skull radiograph.



Fig. 4.—Tracings superimposed on the S-N plane, the unbroken line indicating the patient's tracing.

Hospital. This child's parents were both in their 30's and were in good health. They could not recall any similar anomaly in either of their families. The patient was delivered at full-term. The birth was uneventful, but her birth weight of $5\frac{1}{2}$ lb. was less than that of her 3 brothers and 3 sisters who were all between 7 and $7\frac{1}{2}$ lb. Shortly after birth it was noticed

released with her finger, but she has now learned to correct this and to control the dribbling of saliva at the corners of her mouth.

On examination, her sense of taste seemed to be normal in that she could differentiate upon her stub of a tongue between a faintly acid solution and a sugar solution. Her speech was assessed by a speech therapist as being clearer

than many children of her age with a normal tongue, and speech therapy was not considered necessary. She had difficulty in pronouncing

Similarly, when the lower models are compared (Fig. 6), the patient's arch is so narrow that there is only 9 mm. between the lingual aspect



Fig. 5.—Patient's upper model (A) compared with that of her younger sister (B).



Fig. 6.—Patient's lower model (A) compared with that of her younger sister (B). The distance between the lingual aspect of the patient's \overline{E} and the very carious \overline{E} is only 9 mm. Note also the severe attrition on the buccal surface of the patient's posterior teeth. The comparative freedom from attrition of \overline{B} is probably due to its extreme lingual position. Note absence of \overline{A} .

the labial sounds m, b, and p, and th also presented difficulty [at this point a tape recording of the child's speech was played].

This child's mandible was under-developed (Fig. 1), there being a wider angle than usual between the horizontal and ascending rami of the mandible, and the tracings of the patient (Fig. 2) confirm that the Frankfort mandibular plane angle is higher than that of her sister (Fig. 3). Fig. 4 shows them superimposed on the S-N plane.

When compared with the more normal arch of her younger sister (Fig. 5), the patient's upper arch is narrow and the lingual cusps of her posterior teeth show marked attrition.

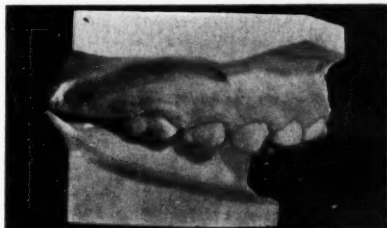


Fig. 7.—Lateral view of the patient's models. The prominence of the upper incisors could have been influenced by her nocturnal thumb-sucking.

of the lower right second deciduous molar and the very carious lower left second deciduous molar. This severe attrition on the buccal

aspect of the patient's lower posterior teeth is the result of the lower arch lying completely inside the upper arch, so that trituration between the molars is more in the nature of an incisal

Radiographs (Fig. 8) show all the upper permanent teeth to be present, with the possible exception of the second premolars, and in the lower jaw (Fig. 9) the corresponding

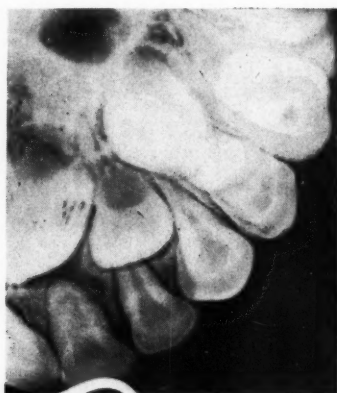
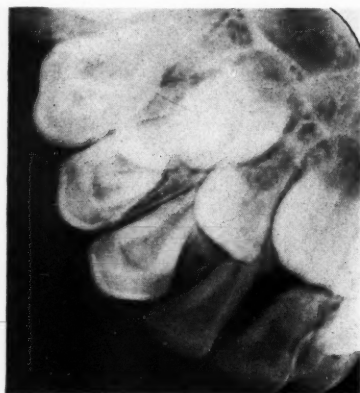


Fig. 8.—Radiographs of the patient's upper teeth.

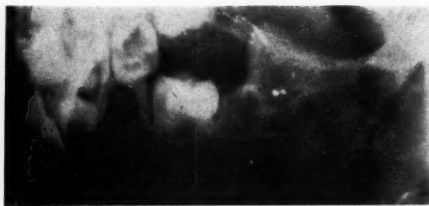
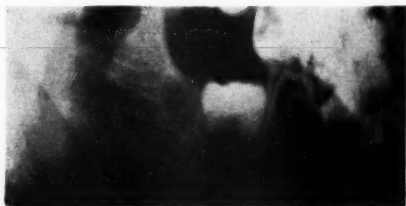
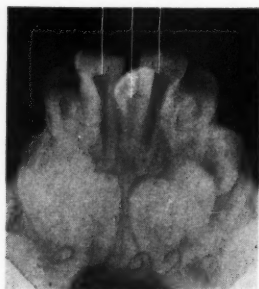


Fig. 9.—Radiographs of the patient's lower teeth.
Note absence of \bar{A}/\bar{A} .

C B C



action. The comparative freedom from attrition and the over-eruption of the lower deciduous incisor are, of course, due to its extreme lingual position. The prominence of the patient's upper incisors (Fig. 7) may have been influenced by her night-time habit of thumb-sucking.

units would appear to be absent. As far as can be ascertained, all the permanent lower incisors and canines would appear to be present, but their eruption is delayed.

Intra-orally (Fig. 10), the over-developed sub-lingual ridges can be seen, together with the tiny stub of a tongue just visible posteriorly.

TREATMENT

Treatment will obviously have to be unorthodox in this case. Apart from conservation of the deciduous teeth, treatment will be deferred as long as possible, preferably until the eruption of the permanent teeth, since any lateral expansion would have to be followed by a fairly permanent retainer in the lower arch.

CONCLUSION

This case shows the tremendous adaptability of the human body and especially the influence

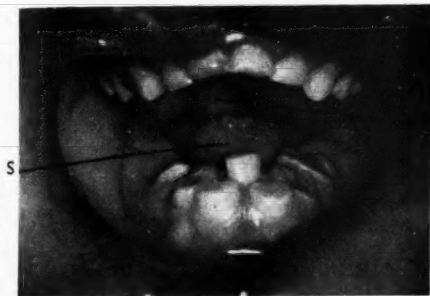


Fig. 10.—Intra-oral view of the floor of the patient's mouth. Note the over-developed sublingual ridges (S) and posteriorly the tiny stub of tongue (T).

of the tongue upon the dental arches. Whether one can go on to suggest that the presence of a tongue is necessary to the development of the non-alveolar portion of the mandible is open to doubt, but it is put forward as a possibility.

DISCUSSION

The President thanked Mr. Gardiner for his most interesting presentation of the case, and said he was to be congratulated on the way he had put it together; it was most instructive.

Mr. H. G. Watkin said that in 1925 he encountered a similar case, a patient aged about eight with about two-thirds of the tongue missing. He was concerned with orthodontics at the Liverpool Dental Hospital at the time, and the patient was taken to him because of her deformity. At first she spoke very badly, but after some twelve months she spoke well, pronouncing "t" and "th" perfectly. She was from a family of seven and was the only one with a deformity. Eventually she obtained a post as a teacher to a family; she spoke so well that she was teaching young children. He could not recall much detail about the case because it was thirty-four years old.

Mr. A. J. Walpole Day thanked Mr. Gardiner and said he felt very guilty himself because some years previously he had seen a similar case but had not reported it. The case was one of a boy of 10½ to 11 years, with fair curly hair and no tongue. An operation was performed and a tongue was made which resembled the top joint of one's middle finger in size and shape. The boy's teeth were rather poor; all the deciduous teeth had gone and the two lower centrals were missing. There was no occlusion. The mandible was small. The child's speech was as good as most children's and better than some.

Dr. R. B. Dockrell said that as reported in the paper he dealt with a similar case with a very small mandible.

Acknowledgements.—I would like to thank Mr. W. Hynes, F.R.C.S., consultant plastic surgeon, for his permission to publish this case and also to Miss J. E. Oliver, of the Speech Therapy Department of the Sheffield Children's Hospital, for drawing this patient to my notice and for help in assessing her speech. My thanks are also due to Mr. J. F. Larway, Chief Photographer of the United Sheffield Hospitals, for the ciné photography [the paper was illustrated by a ciné film], to Mr. R. Cousins of the Dental Hospital for the preparation of the illustrations, and to Mr. P. M. Benzie for help in preparing the tracings.

REFERENCES

- DOCKRELL, R. B. (1949), *Trans. Brit. Soc. Orthodont.*, 90.
 ESKEW, H. A., and SHEPARD, E. E. (1949), *Amer. J. Orthodont.*, 35, 116.
 FARRINGTON, R. K. (1947), *N. C. med. J.*, 8, 24.
 JUSSIEU (1718), *Hist. de l'acad. des Sciences*, 612.
 KETTNER (1907), *Dtsch. med. Wschr.*, 23, 532.
 DE LAMOTHE, G. D. (1930), *Ann. Mal. Oreil. Larynx*, 49, 717.
 ROSENTHAL, R. (1932), *Amer. J. dis. Child.*, 44, 383.
 SINCLAIR, J. G., and MCKAY, J. (1945), *Anat. Rec.*, 91, 155.
 WATKIN, H. G. (1924), *Trans. Brit. Soc. Orthodont.*, 37.

The child concerned was then about five years of age and the anterior portion of the tongue was missing. Late eruption of the teeth was present, but the speech was good. So far as he knew he did the patient absolutely no good and it was with considerable relief to hear that she later refused to go on wearing an appliance. She had a single lower central incisor lingual to the two canines. No other abnormality could be found at the time, but now she was quite obviously dwarfed.

Mr. Oliver asked whether Mr. Gardiner had gone into the aetiology from the genetic viewpoint?

Mr. Gardiner replied that he had not considered the case beyond the points referred to in the paper. It would bear a considerable amount of research. As far as the mother was concerned there was no other similar case in the family, but it was difficult to get information relating to the father.

The President asked when the condition was first noticed.

Mr. Gardiner said that the deficiency of the tongue was noticed a few hours after birth when the child could not suckle, but the case was brought to his notice a few months previously.

The President said there was presumably no reliable information as to the early state of the arch.

Mr. Gardiner said that was so. His records went back only a few months.

The President said they would be seeing the child concerned the following afternoon. They were all grateful to Mr. Gardiner for presenting the case so fully and so well.

MODIFIED 0.7 mm. LINGUAL ARCH FOR ANTEROPOSTERIOR EXPANSION OF THE MANDIBULAR ARCH

By D. G. GOULD, B.D.S., F.D.S., D.Orth. R.C.S.

CASES where there is a slight lack of room for lower premolars can be treated by anteroposterior expansion of the lower arch, provided

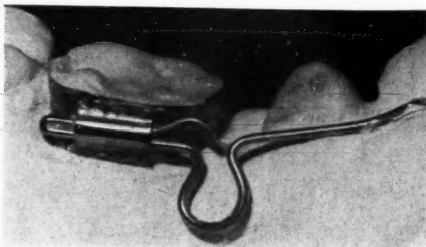


Fig. 1.—Molar band with double horizontal tube welded in position.

that the soft-tissue pattern will tolerate some proclination of the lower labial segment. A method of anteroposterior expansion is described which, by adapting the "puller-outer" principle, as described by C. V. Hill (1954), enables one to activate an 0.7-mm. lingual arch wire without removing the appliance from the mouth.

METHOD

Molar bands are made for the lower first permanent molars and a model is made with the bands in position. Double horizontal tubes, made of 5×0.15 -mm. backed by 3×0.1 -mm. stainless steel tape, are welded to the lingual surface of the bands so that they are horizontal. (Fig. 1.)

A lingual arch of 0.7-mm. stainless steel wire is adapted to the arch with a loop (ABC) in the premolar region. (Figs. 1, 2.) A bend is made in the arch at D and the wire beyond D is annealed. The wire is then bent tightly on itself so that it will slip in and out of the double horizontal tubes. The wire is inserted into the tubes and the stop EFG is bent.

The lingual arch with the bands is cemented in the mouth (Fig. 3) and is activated to give

anteroposterior expansion by gripping the stop EFG with pliers and applying traction so that the loop (ABC) tends to close. Activation is maintained by bending the wire occlusally at E and forming a new stop in the softened wire.

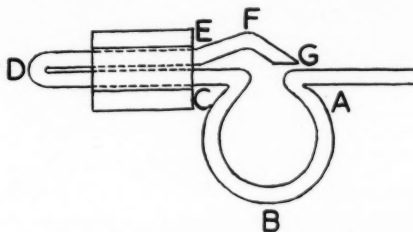


Fig. 2.—Details of "puller-outer" and loop.

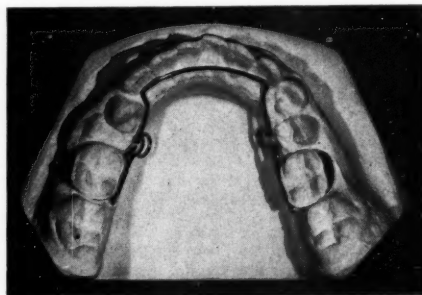


Fig. 3.—Completed lingual arch ready for insertion.

At subsequent visits the activation can be done in a similar way without removing the appliance from the mouth.

Acknowledgements.—I am grateful to Mr. S. G. McCallin, Consultant to the Eastman Dental Hospital, for his help in preparing this article, and to Mr. W. J. Morgan, A.R.P.S., for the photography.

REFERENCE

HILL, C. V. (1954), *Dent. Practit.*, 5, 52.

Demonstration given at the Manchester meeting held on April 18, 1959.

AN INVESTIGATION INTO THE INFLUENCE OF THE SOFT TISSUES ON TOOTH POSITION

By D. A. DIXON, F.D.S., D.D.O.

Orthodontic Department, Edinburgh Dental Hospital

THE analysis of the pressures exerted on the teeth by the surrounding tissues is of fundamental importance in many fields of dentistry. The evaluation of an orthodontic, prosthetic, or periodontal problem often depends on concepts held by the clinician on the effect of the surrounding soft tissues on the position of the teeth. This paper will shortly review the present knowledge in this field and will present a new technique for the demonstration of such pressure effects that may influence the tooth position.

Recently, in an orthodontic text-book, Moyers (1958) writes that the teeth are in balance between the lips, cheeks, and the tongue, and when there is a change in the muscular environment the teeth will be moved through the bone until there is again balance. This concept was first put forward in a paper on jaw development by Charles Tomes (1873) in which a case of hypertrophied cheek tissue and resultant arch deformity is described and it is suggested that "the agency of the lips and tongue is that which determines the position of the teeth". This idea has gradually gathered support and is now well established in current teaching.

It is well to consider on what evidence this theory is supported. First, there is a large amount of clinical evidence that when the posture of the lips, cheeks, or tongue is abnormal, the position of the teeth is found to be abnormal also. The influence of the lips on the position of the incisor teeth is well established. With protrusion of the upper incisors there is often a condition described by Sclare (1957) as the "trapped lip". The lower lip is positioned between the lower and upper incisors and is a potent cause of relapse if the orthodontic treatment is not skilfully completed. Nicol (1954) analyses the position

of the lip relative to the incisor teeth. He reports that with a deep overbite the upper incisor position is dependent on the relationship of the lower lip to these teeth. Twin studies by Leech (1955) and Townend (1954) give weight to the theory that the position of the upper incisors is controlled by the lower lip. Attention has been focused on abnormal tongue activity in swallowing as a causative agent in malocclusion by the work of Rix (1946). Anterior open bites can be caused by this tongue-thrusting behaviour and may prove very resistant to correction.

More extreme examples of the interconnection of these factors are occasionally seen. With macroglossia the teeth are usually spaced, and with aglossia the arches may be contracted. In cases of cleft lip and palate the operation on the lip can produce an abnormally tight upper lip due to the formation on scar tissue. The effect of this is often to deflect the erupting upper incisors palatally and collapse the arch segments. Deformities of the dental arch associated with various forms of muscular paralysis have been recorded by a number of observers. The literature on this aspect is thoroughly covered by Brash, McKeag, and Scott (1956). The tendency to relate these findings in severe abnormalities to the environment of the normal mouth must be resisted. However, the preceding evidence, if seen in isolation, appears convincing, and the conclusion that the teeth are balanced between opposing muscular forces is utilized in both prosthetic and orthodontic treatment procedures. It is, therefore, all the more necessary that the subject be closely examined, and evidence both for and against presented before final evaluation.

A clinical feature that is not often described is that of indentation of the soft tissues by

the teeth. This is sometimes observed on the lower lip when this is positioned between the upper and lower incisors (*Fig. 1*). The tongue itself is not frequently seen to be indented by the premolars and molars, and examples are occasionally seen in other parts of the mouth.

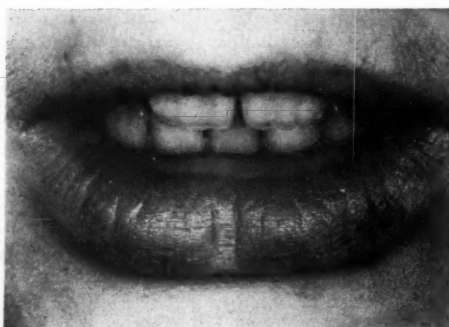


Fig. 1.—Indentation of the lower lip by the upper incisors.

This may indicate that although the soft tissues are applying pressure to the teeth, these do not always move into a completely neutral position with their environment.

The maximum pressures exerted by the lips and tongue on dynamometers were measured by Friel (1926). The tongue pressures recorded consistently exceeded the lip pressures in this fine study. A further number of investigations on oral pressures have been reported in recent years using manometric techniques. Stevens (1956), Hopkin and McEwan (1957), Kydd (1957), and Sims (1958) report that the pressures exerted by the tongue exceed lip pressures, and no correlation between incisor position and such pressures has been found. Simultaneously with these investigations Winders (1956, 1958) has utilized a strain gauge technique to study the pressures exerted by soft tissues on the teeth when swallowing and at rest. He states that during function there is an imbalance of myometric forces acting on the dentition—the tongue exerting a much greater force than the peri-oral musculature.

Criticism of the general validity of these experimental findings has been put forward by Graber (1958), who considers that the

active functional pressures may be of less importance than the more constant postural effects and that the pressures of the tissue masses may be the main factor in determining tooth position. Therefore, there appeared a need for a technique to show the total effect of the forces, both functional and postural, exerted on the tooth during a period of time and capable of revealing the position of balance that would be taken up by a tooth exposed to these forces. Viscosity techniques are a promising line of attack, and it is a simple method which has been developed from this line of thought that is demonstrated. This gives a visual record of the position of balance of the teeth in their soft tissues environment.

The method adopted was to attach an artificial tooth to a small partial denture in such a way that it was freely movable buccolingually (*Fig. 2*). On this denture a cross-piece of edgewise arch wire is fixed and the tooth is attached to this through the agency of a precision-fitted piece of rectangular tubing.

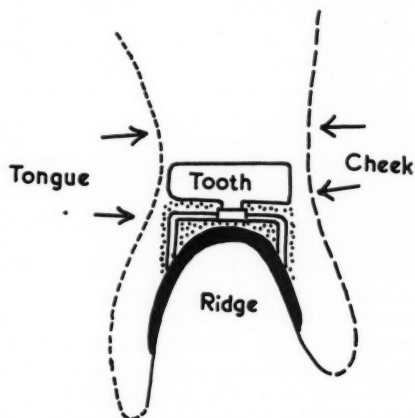


Fig. 2.—Diagram of the apparatus.

This allows movement freely across the ridge but imparts stability in other directions. By filling the intervening space between the tooth and the plate with chewing-gum, it was found that the tooth would move to light forces in the region of 5 g., but would remain stable in position when the force was removed.

Dental students who had dentitions with normal relationship between the arches but missing teeth in the buccal segments volunteered to wear these appliances. The tooth was made so as to imitate the form and

to a position in the line of the arch is generally more vigorous than the effects of the cheeks (Nos. 3, 4, 5, 7). There is considerable variation in each subject, and in one case (No. 1) the tooth was stable for a considerable distance

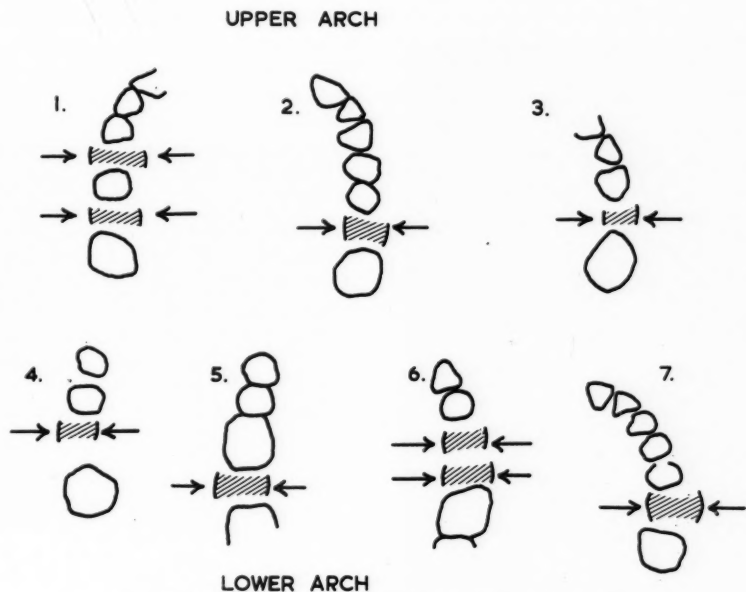


Fig. 3.—Tracings of experimental results in individual subjects.

position of the missing tooth as far as possible and was cleared from the occlusion. The denture support was as small as possible and the appliance worn for a period to accustom the wearer to it and to eliminate any reflex movements caused by the pressure of an unaccustomed object in the mouth.

These appliances have been used in a number of instances in the molar and premolar regions. The method adopted has been to move the tooth to an extreme buccal position and the plate is worn for a night and the position recorded. The same procedure is carried out with the tooth in an extreme lingual position and the mean of three recordings, if reasonably coincident, is taken (Fig. 3). This drawing shows the results of the investigation so far. It can be seen that the effect of the tongue in replacing the tooth

either buccal or lingual to the line of the arch. The tendency of the tooth to move to a buccal position is well shown in Fig. 4. In this subject the artificial teeth were placed in the line of the arch before the appliances were inserted in the mouth. The upper tooth moved to the buccal slightly, while the lower tooth is a considerable distance buccal to its original position. Although this simple method does not lend itself to a detailed analysis, it may be said that the teeth in the buccal segments in the young adult are not balanced in position by the cheeks and tongue. In this small series the state of imbalance is more marked in the lower arch.

A number of other factors which affect the arch shape are known. The effect of the inherited morphology or the occlusion have not been discussed. However, it is worth while to

analyse the evidence on the effect of the soft tissues as far as this extends at present. First, a considerable amount of clinical evidence suggests that when there is an arch mal-relationship, or some abnormality of posture or activity of the soft tissues exists, the

the normal occlusion of the adult. Finally, the incomplete state of knowledge at present, and the individual variation which is apparent, indicate that dogmatic statements should be avoided.

SUMMARY

The concept that the dentition is in a state of balance in the soft tissues is examined. The clinical and experimental evidence on this subject is reviewed, and it is concluded that this concept cannot be supported in the light of present knowledge. A new method of investigation of oral pressure effects is described.

Acknowledgements.—I should like to thank Mr. Hopkin and Dr. Logan, Consultants in Orthodontics, Edinburgh Dental Hospital, for their interest and help. The photographs are the expert work of Miss Bensted, Mr. Hunter, and Mr. Standin, and finally the interest and co-operation of those who wore the appliances should be recorded.

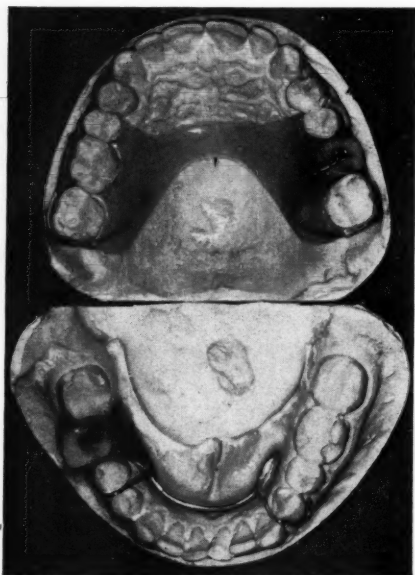


Fig. 4.—Experimental appliances replaced on models.

position of the teeth can be influenced by the pressures exerted by the soft tissues. Secondly, a number of investigations using different experimental techniques have collectively shown that this concept cannot be extended to state that the teeth are balanced between soft-tissue pressures in

REFERENCES

- BRASH, J., McKEAG, H., and SCOTT, J. (1956), *The Aetiology of Irregularity and Malocclusion of the Teeth*, 2nd ed., 373. Dental Board of the United Kingdom.
FRIEL, S. (1926), *Brit. dent. J.*, **65**, 353.
GRABER, T. (1958), *Amer. J. Orthodont.*, **44**, 26.
HOPKIN, G. B., and McEWAN, J. D. (1957), *Dent. Practit.*, **7**, 313.
KYDD, L. W. (1957), *J. Amer. dent. Ass.*, **55**, 646.
LEECH, H. (1955), *Dent. Practit.*, **5**, 341.
MOYERS, R. (1958), *Handbook of Orthodontics for the Student and General Practitioner*, 106. Chicago.
NICOL, W. (1954), *Dent. Practit.*, **4**, 220.
RIX, R. E. (1946), *Trans. Brit. Soc. Orthodont.*, **15**.
SCLARE, R. (1957), *Brit. dent. J.*, **102**, 398.
SIMS, F. W. (1958), *Amer. J. Orthodont.*, **44**, 64.
STEVENS, H. M. (1956), *Ibid.*, **42**, 937.
TOMES, C. (1873), *Dent. Cosmos*, **15**, 292.
TOWNEND, B. R. (1954), *Brit. dent. J.*, **97**, 181.
WINDERS, R. V. (1956), *Amer. J. Orthodont.*, **42**, 645.
— (1958), *Angle Orthodont.*, **28**, 226.

The Use of Regional Anaesthesia with General Analgesia in Oral Surgery Practice

The authors divide the stage of analgesia into three planes: Plane 1 in which pain is diminished and full consciousness maintained; Plane 2 in which the patient lingers between consciousness and unconsciousness; and Plane 3 in which consciousness is lost. True surgical anaesthesia is not achieved, however, at this

point, as any operative interference will bring about a brisk response. If a local anaesthetic is injected at this stage, the operation can be completed without the patient being conscious of it. The advantage of this technique is its safety and the high concentrations of oxygen which may be given.—DOUGLAS, BRUCE L., and KRESBERG, HAROLD (1959), *J. oral Surg.*, **17**, 82.

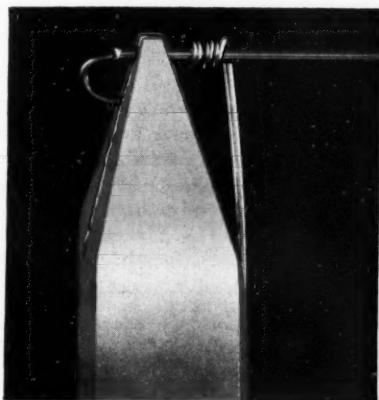
AIDS TO APPLIANCE TECHNIQUE

By MRS. S. J. JACKSON, F.D.S., D.Orth. R.C.S.

Lecturer, Manchester Dental Hospital

1. The Construction of a Twin Wire Arch Intermaxillary Hook.—The hook is made from 0.5-mm. hard stainless steel wire and is constructed in the following way: three coils are made by winding the wire round a spare

parallel together with universal pliers, an excellent purchase is obtained (*Fig. 1 A*). The wire is cut off about an inch from the coils, but the hook is not made. The attachment can be prefabricated up to this stage. It is slid easily onto the end tubing of the twin arch and held at its mesial end by flattening the tubing immediately behind and in front. The hook is now made with loop-forming pliers and excess wire is cut away. *Fig. 1 B* shows the position of the finished hook finally adjusted and locked into place by flattening the coils with universal pliers. The hook has the advantage that it can be made easily and quickly and solder joints



A

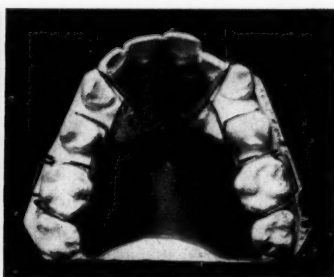


B

Fig. 1.—A, Making the coils; B, The finished hook locked in position.



A



B

Fig. 2.—A, Position of retaining wire during retraction of $\frac{4}{4}$; B, Wire bent at right angles to retain $\frac{4}{4}$ during retraction of $\frac{3}{3}$.

piece of twin arch end tubing to give a slide fit on the tube. To prevent the tube and wire slipping in the plier beaks as the coils are wound the wire is pushed down the end tube, and doubled back, and as the two are held

are avoided. It can be accurately positioned and added to an arch wire, and the rigid hold gained from the flattened coils and end tubing prevents the hook swinging out under the influence of intermaxillary elastics.

Demonstration given at the Manchester meeting held on April 18, 1959.

2. A Retaining Wire used when Retracting Two Teeth with a Single Finger Spring.—If an additional wire is incorporated into finger spring construction running parallel with the

method of keeping these bands in order is to thread them on to a strip of card with a wire strengthener. The patient's name, date of next appointment, and "Right" and "Left" can be



Fig. 3.—Bands kept in order on card strip.

guide wire it can be used to retain one tooth after it has been retracted, allowing the spring to be used to move a second tooth into the space (Figs. 2 A, B). Its most useful application is in the retraction of 43|34.

3. A Simple Method of Storing Bands.—Orthodontic bands are often constructed at one visit and inserted at another. A simple

marked on the card (Fig. 3). These strips are widely used by laundries and gardeners. Storing bands on strips of wax may be the subsequent cause of a poor cement bond between tooth and band.

I wish to express my thanks to the Department of Medical Illustration, United Manchester Hospitals, for the photographs.

Simplified Crown and Bridge Treatment for the General Practitioner

The main requisites of a fixed bridge are to: (1) Restore occlusion; (2) Promote health of periodontal tissues; (3) Prevent tilting, etc., of teeth; (4) Help prevent decay of abutment and adjacent teeth.

Diagnosis.—Only in the very young is a fixed bridge contra-indicated. Mobility of teeth is usually a contra-indication, but an exception would be in the mandible when the alveolar ridge is spine-like or absent, and in this case the abutments should be multiple if possible. In a case where all the lower teeth are missing, except the canines and/or the premolars, it would be wise to replace the incisors with a fixed bridge and the posteriors with a partial denture. In this way tipping of a denture, made to replace all the missing teeth, is obviated, as is settling of the denture anteriorly with consequent loss of incising ability. Long spans and short abutment teeth do not conduce to satisfactory bridge-work unless the abutments are multiple at each end of the bridge. Tooth devitalization is not a contra-indication, but if such teeth are used as

abutments they must be capped with gold to prevent fracture.

Treatment planning includes attention to extruded teeth in the opposing jaw—from simple grinding to the placement of restorations if the denture has to be exposed, depending on the degree of extrusion. Tilted teeth must be restored to the occlusion if they are to be used as abutments. The length of the span of the bridge determines the buccolingual width of the pontics—the longer the span the narrower the pontics. For the replacement of lower posterior teeth, the hygienic type of pontic is recommended. Gold-acrylic or gold-porcelain pontics are used for upper posteriors. The pontic is to touch the ridge only lightly with minimum contact area. The porcelain must be re-glazed after it has been ground to fit the ridge, and the occlusal surface must always be gold. The use of acrylic for anterior pontics is contra-indicated in mouth-breathers. In preparing the abutments pay attention to retention, protection from caries and fracture, and to the improvement of appearance where indicated.—CAVANACH, W. D. (1959), *J. Canad. dent. Ass.*, 25, 294.